PSYCHO-BIO-PHYSIOLOGY

BY WILLARD CARVER,
LL. B., D. C.

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PSYCHO-BIO-PHYSIOLOGY

Consisting of Applied
Psychology, Biology as the Cause of Histology
and Anatomy and a Description of the
Conduct of Anatomic Parts,
which is Physiology

By Willard Carver, LL. B., D. C.
President of Carver Chiropractic College of Oklahoma City and also of New York City;
formulator of the Science of Chiropractic;
Instructor in Anatomy, Physiology, Pathology, Biology and Psychology;
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Preface to the Present Work

THIS is a compilation of parts of several books that I have furnished to the profession.

These books it seems to me have been gladly received and I would not do justice to their many readers, who have written me concerning them, if I did not believe that they have gratified a real desire, and been of value as tools of efficient service.

I think I have observed a growing need for a book—literary and scientific, instructive as well as entertaining, both for professional preparation and use, and for the use of the layman

Chiropractic principles need to be disseminated as carefully and fully, in certain ways, to growing children and society in general—as they do to the professional Chiropractor. This book is formulated to meet that need.

To the professional person it is a text book of incalculable value. To the non-professional person it is a mine of simple and exact truth that cannot be found in concrete form elsewhere

In the production of this book I have included, practically unchanged, "Applied Psychology" published by me in 1914 and which was received with such enthusiastic approval, that it met with no criticism anywhere.

I have included here the complete Physiology deduced from the basic principle of Chiropractic, with certain corrections of spelling, punctuation, paragraphing and selection of words, as found in "Carver's Chiropractic Analysis," which I published in 1915.

Between the Psychology and the Physiology I have built the Biologic bridge that scientifically connects these two very important departments of human experience, using much

that I have already published in my Preparatory "Outline for Chiropractic Study," and adding thereto much that I have not published before.

The Embryologic portion is sufficiently illustrated for study purposes ☙ ☙

At the opening of each Physiologic department there is an Anatomic Synopsis of the organs involved in the discussion, with sufficient cuts of the same to render the discussion perfectly clear and easily understood.

It is my earnest hope that this book will be as well received as those that preceded it, and when it is, the author will be repaid for this strenuous, though self-imposed, task.

WILLARD CARVER.

DEDICATION

TO all that have patiently, persistently and honestly striven to know truth and in their efforts for such acquisition have understood that in the Universe—all that is—is essential and necessary and that each attribute, organism, organ, segment, atom or thing has its place and relationship in the great harmony—and to all that shall come in like spirit and recognition in the future—this book is most respectfully dedicated.

By the Author

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Part One

Applied Psychology

A Series of Lectures
presenting an Analysis of
Psychology in a Simplified
Terminology; with Special Attention
to Biologic Phases of Physiology and
Demonstrating the Separateness
of the Entities Mind
and Soul

By Willard Carver, LL. B., D. C.

Preface to Psychology

IN the final and last consideration, there is but one important fact that presents itself to us, and that is *our existence.* The highest proof that we may have of this fact is only our consciousness of it. For if asked to prove our existence, we are in a more helpless condition than with respect to almost any other subject. We can make some show of tracing our ancestry; of following out the history of nations; of getting reasons for conditions ordinarily considered to be within the scope of science, but as to our individual existence, our highest proof is but our consciousness of it.

The next most important fact is our knowledge of self. Pope has said that "The greatest study of mankind is man;" but I would say that the greatest study of mankind is to learn how to study himself.

Human beings generally conceive that they are learning about themselves when they are studying history and science, but really all they are doing, in such study, is getting *farther from self*, for after all, the study of history and the sciences furnish nothing of value as to self, for history always fades into tradition and tradition becomes lost in the night of time; and the so-called sciences when investigated with sufficient care and analysis resolve themselves into theories and the theories finally resolve themselves into the misty substance of phantasm and lose themselves in the vortex of dreams.

The individual therefore that would *study self;* that would *understand self*, must confine his *investigations to self.* He must *recognize* the *fact of his existence as paramount to all other facts* and must bring himself to understand that all that he can know of *self* must be ascertained by means of *introspection through the processes of deduction. He must come to understand that in the analysis of self lies his only field of research, except, solely immediate comparison with his fellows.*

The following lectures were delivered entirely from the standpoint herein disclosed and assumed to enter no other field. It was the highest object to show the complete separateness of Mind from Soul. The lectures present and sustain the proposition that the relation of Mind to Soul is the same as that sustained by the *function of any organ* to the Soul. That is to say, the *production* of Gastric Juice, from the *walls* of the Stomach, sustains the same relation to the Soul, that the production of Mind, in the Brain, sustains to the Soul.

This preface is presented because it is the belief of the author that it is upon the points herein presented that writers on Psychology, as well as people generally, have gone astray, and he has therefore taken this opportunity to attract special attention to these thoughts in advance.

WILLARD CARVER.

Foreword to Psychology

THE lectures herewith presented for consideration were delivered in the auditorium of Carver Chiropractic College as a part of my regular work as Dean of the faculty, to the student body and the public, that is each year invited to attend during the course of psychic lectures.

At the time of their delivery there was no intention that they should be published in book form but I had intended and had arranged to have each lecture preserved and multigraphed in sufficient numbers to supply the students desiring them. After the delivery of the second lecture, I was importuned by friends to preserve the lectures with great care and to publish them in book form.

I acceded to these requests and since the transcripts of the lectures were returned to me, I have given them careful consideration, to make certain that they contain in clear, terse language what I said at the time of delivery, as well as what I intended at that time should be conveyed.

The lectures were delivered from synopsis outlines. I had prepared these outlines with the intention of covering the entire field of psychic research with the exception of that branch of it properly referred to as Spiritism.

I purposely refrained from especially discussing the subject of Spiritism, because to do justice to that subject would require much more scope than a lecture and more space than I have in this book. And then Spiritism is an incident to a religion presenting a health phase; and in this course of lectures it was not my intention to enter the realm of the controversial, but to keep clearly within the scope of analysis and deduction; addressing myself more particularly to the health phases of religions; and that more especially for the purpose of criticism—to shock the mind into a realization of truth—rather than to present a basis for controversy. For

this purpose, I have reverted at some length to Christian Science, because of its relation to healing that is peculiarly within the limit of thought that I have sought to present in the succeeding pages, and I have addressed myself to Spiritualism more briefly but in the same way.

It was my intention to reduce the voluminous and scattered fragments of psychologic truth to a simple and concise statement, giving to the student a basis of truth for deduction and experimentation rather than an hypothesis for inductive inquiry and speculation.

I sought to give the student a ready, comprehensive and terse terminology, so clear and exact and so perfectly illustrated as to render error of understanding substantially impossible and to make application under any circumstance a matter of the greatest ease and certainty.

It was my purpose to remove from the subject of Psychology all unnecessary, unwise, and useless suggestions of mystery; to reduce all phenomena presented to the simple basis of actuality—to the real and palpable—to bring the subject near to the student and make him feel its intimacy in his every thought and action.

It is unnecessary to say that such work was a stupendous task, when one pauses to consider the eminent modern writers upon this subject such as James, Hudson, Warman and many others; and then recalls the earlier writers whose works all told run into hundreds. And yet the real work of such an accomplishment was very much easier than one would imagine, for it must be remembered that all of these writers wrote from the standpoint of induction with the exception of part of the writings of Warman—therefore their works have been voluminous; but I have treated the subject by the process of deduction and deduction is always brief and exact.

As I look over these lectures in giving them to the press, I desire to say that upon the themes they cover they are sufficiently comprehensive. I am very certain that the principles disclosed could have been rendered more understandable by a wider range of illustration. Those, however, were supplied by voice and gesture in the delivery of the lectures, but I am

persuaded that without these no student, actuated by an earnest desire to know, will fail to understand what I have intended to convey.

I am aware that much that is said is wholly new; that many positions taken are clearly opposed to the most eminent authors that have written upon such subjects, and especially in very recent years; but for these I offer no apology. I have followed the dictates of my mind unswervingly and my mind has unswervingly followed the dictates of demonstrated truth.

¶ Let me here caution the student that Psychology is the most comprehensive and important theme that can engage the attention of a human being and that it is of the first importance that he shall be able to isolate the basic principles and fix them correctly in mind before attempting to pursue the subject further.

The basic principles are few and simple, and for that reason if the student gets a misunderstanding about them or fails to clearly separate them and thoroughly impress them on his mind he may never be able to know that he is in error and, therefore, never become proficient in an understanding of the Science ☙ ☙

At this juncture let me say that it is not the *amount you read* in psychology that makes you a psychologist, but it is the amount you *understand and know* that determines your right to that title. Go slow—be careful and painstaking, for the subject is beset on all sides by wild, distorted, injurious theories and fancies. Keep to the *plain* and *common sense*, for the science of psychology consists in nothing but simple truth. The very question the student should investigate is sometimes difficult to ascertain. These questions are carefully propounded in the quiz following; with the page and sometimes the part of page, when important, referred to.

I publish these thoughts trusting that they will save thousands of individuals the necessity and pain of going through years of toil and mental agony, as I have done, in reaching the wondrous passivity that comes with the certainty of truth ☙ ☙

WILLARD CARVER, LL. B., D. C.

Psychology Quiz

1—What is the purpose of the study of Psychology?
Ans. It is threefold: (a) To inform us of the material construction of the body. A. P. 25, 3d p. (b) To understand our minds. A. P. 26. (c) To understand what we can of the soul and its qualities. A. P. 26, 3d p., and pages 27-28. For greater detail, reference is made to Biology and Embryology herein.

2—What have been the ways of studying the soul?
Ans. It has been studied as mental philosophy or metaphysics and demonstrated in all religions. A. P. 26-27-28.

3—What is Psychology?
Ans. Psychology consists of the truths concerning the soul. A. P. 28-29, 1st p.

4—What is the Science of Psychology?
Ans. A. P. 29, 1st p.

5—Why should we be very careful in the selection of language in discussing Psychology?
Ans. There is no soul language. A. P. 29, 2nd p. and 30-31 to last p.

6—What is the soul?
Ans. A. P. 32, 4th p.

7—What is the history of the word?
Ans. A. P. 30-31.

8—What is the mind?
Ans. It is the function of the physical brain. A. P. 34, 6th p., and 35-36-37, to 3d p.

9—Has the soul a mind?
Ans. It has not. A. P. 32, 5th p., 33-34.

10—Why have Psychologists erred?
Ans. A. P. 30,-32-33.

11—Biologically, what is the mind as a function compared with?
Ans. Functions of all organs of the body. A. P. 36-37.

12—What are the offices of the mind?

Ans. A. P. 36, 4th p., and 37-38.

13—Of how many parts does the intelligence department of man consist?

Ans. Two, mind and soul. A. P. 38, 1st p., 39, to 3d p.

14—What character of terms should be used to indicate or refer to the soul?

Ans. A. P. 34, 3d p., 35, to p. 2.

15—How did we come to have the word, soul?

Ans. It is the result of the inventive genius of man. A. P. 30, p. 31.

16—What are our means for ascertaining knowledge of the soul?

Ans. Through the mind. A. P. 40, p. 1.

17—Does this fact make prominent a duty?

Ans. Yes, to study the machine thoroughly that produces the mind. A. P. 26-35-40-41, to last p.

18—What characterizes all of the attributes of mind but one?

Ans. They are limited by the physical. A. P. 43, first p., 40-26-32.

19—What attribute of mind is not limited by the physical?

Ans. It has deduction. A. P. 42.

20—Has mind attributes that we may conceive could be perfected?

Ans. A. P. 43, p. 2, 44, p. 8.

21—Does the fact that the mind has the quality of deduction with the qualities mentioned in the last answer prove its relationship to anything superior to the physical?

Ans. A. P. 41, p. 6-7, and 46-47.

22—May we apply the same test to soul that we have applied to mind?

Ans. A. P. 45, p. 2.

23—What remarkable fact does this question bring to our attention as its answer?

Ans. That the soul does not possess any quality not capable of being conceived perfect. A. P. 45-46-47.

24—What are the distinguishing attributes of the soul?
Ans. A. P. 46, p. 2-3.
25—If the attributes mentioned in the last question were conceived as being multiplied to perfection, what would that fact necessarily prove to us?
Ans. A. P. 46, p. 5-6.
26—Does the fact that the soul of man possesses the qualities mentioned in the last question potentially prove anything respecting it?
Ans. A. P. 46, p. 5.
27—Does the possession of omnipotence, omnipresence, omniscience and creative love negative the possession of lesser qualities?
Ans. Yes, certainly. A. P. 47, p. 1.
28—If the soul of man is potentially like the great soul that possesses these qualities in perfection, may we conceive that it possesses qualities of a lesser nature?
Ans. A. P. 46, p. 6, 47, p. 1, and 68, p. 2.
29—Since the mind is the physical agent of the soul, what important truth must we learn affecting our minds, from soul relationship?
Ans. A. P. 48, p. 1, 69, p. 9, and 70, p. 1-2.
30—What is the mind's relation to the soul?
Ans. A. P. 38, p. 2, and 32, p. 5-6-7, and 49, p. 1, and 107, p. 5-6, and 112, p. 2, and 113-114, and 117, p. 3-4.
31—Do we here have revealed the necessary truth for evolution?
Ans. A. P. 48, p. 7, and 45 and 120, p. 1.
32—What is suggestion?
Ans. A. P. 51, p. 4.
33—What are the general errors as to suggestion?
Ans. A. P. 50-51-52-53-54.
34—Generally, when is suggestion accomplished?
Ans. A. P. 53, p. 3.
35—Suggestion—defined as a technical word of Psychology?
Ans. A. P. 51, p. 4.
36—What are the two classifications of suggestion?
Ans. 1. Auto suggestion. 2. Suggestion from all extraneous sources. A. P. 53, p. 5-6, and 54, p. 1-2.

37—Is the soul ever amenable to control by suggestion?
Ans. A. P. 55, p. 5-6-7, and 56, p. 1.
38—When is the soul not amenable to control by suggestion?
Ans. A. P.55, p. 3-4.
39—What lesson does the last answer teach us?
Ans. A. P. 56, p. 1.
40—What are the two modes of giving suggestion?
Ans. A. P. 56, p. 3-4.
41—For the purpose of distinguishing it, what do we mean by a specific suggestion?
Ans. The thought here is directed to the giving of a suggestion for the accomplishment of a definite, as distinguished from a general, purpose. A. P. 58, p. 4, and remainder of chapter.
42—What is telepathy?
Ans. A. P. 67, p. 5-6.
43—When is suggestion telepathy?
Ans. A. P. 68, p. 1, and 57, p. 1.
44—How must the suggestion in telepathy be given?
Ans. A. P. 57, p. 1, and illustration beginning with p. 2.
45—Is telepathy common experience?
Ans. A. P. 72, p. 7, and 73, p. 1-2-3-4-5-6.
46—What is the relation of belief to telepathy?
Ans. A. P. 70, p. 1-2-3-4.
47—In recent years, has invention added faith in telepathy?
Ans. A. P. 72, p. 2-3-4-5-6-7.
48—What are the two kinds of telepathy?
Ans. A. P. 74, p. 2.
49—What is involitional telepathy?
Ans. A. P. 74, p. 3.
50—What is volitional telepathy?
Ans. A. P. 74, p. 7.
51—Which is the most used, and why?
Ans. A. P. 75, p. 2, and 75, to p. 5.
52—What is the value of volitional telepathy?
Ans. A. P. 75, p. 5-6, and pages 76-77.
53—Is this form of telepathy an aid to diagnosis?
Ans. A. P. 77, p. 1-2.

54—Has intention anything to do with telepathy?
Ans. A. P. 78, p. 1-2-3-4.
55—What is the relation of willingness to intention?
Ans. A. P. 90, p. 6-7-8-9, and 91, p. 1-2-3-4.
56—Is telepathy a special or general ability?
Ans. A. P. 78, p. 3.
57—What are the steps for volitional telepathy?
Ans. Faith. A. P. 78, p. 1-2-3-4. Honesty. 79, p. 3. Persistence. 79, p. 4. The message. 80, p. 1. Time, to send. 81, p. 1-2. Wording the message. 80, p. 3. Conduct after sending. 81, p. 5. Illustration. 82, p. 4.
58—When will there be no involitional telepathy?
Ans. A. P. 83, p. 6, to end of chapter.
59—What is hypnotism?
Ans. A. P. 87, p. 1, and 88, p. 1.
60—What are the two modes of the sleep?
Ans. A. P. 87, p. 5-6-7.
61—When can hypnosis be accomplished?
Ans. A. P. 90, p. 3, and to p. 4, 91.
62—When can hypnosis not be accomplished?
Ans. A. P. 91, p. 4-5, and 93, p. 1.
63—What are the erroneous concepts as to hypnotism?
Ans. As to the will. A. P. 88, p. 3-4-5-6-7. As to the operator. 89, p. 2-3. The thing itself mysterious. 89, p. 5-6-7. Against fixed desire. 90, p. 3. Divulging a secret. 92, p. 2. Against fixed principle. 92, p. 5. Weakens will. 94, p. 3. Destroys mind. 94, p. 4.
64—What are the different methods of producing hypnosis?
Ans. A. P. 98, p. 6, and 99.
65—Is hypnosis of value?
Ans. A. P. 103, p. 3, and remainder of chapter.
66—What is the sane thought respecting the material being and the soul?
Ans. A. P. 106, p. 1-2-3-4.
67—Why must we begin with the mind in the investigation of psychic things?
Ans. A. P. 107, p. 4-5.

68—What is knowledge?
Ans. A. P. 108, p. 6.
69—What are the two ways to acquire knowledge?
Ans. A. P. 108, p. 8, and 109, p. 2.
70—What is included in the dogmatic method?
Ans. A. P. 109, p. 3, and 110, p. 5-6-7-8, and 111, p. 2.
71—What is the other method of receiving knowledge?
Ans. A. P. 111, p. 3-4.
72—What is the caution that must be observed as to intuition?
Ans. A. P. 112, p. 2-3-4-5-6-7.
73—When is intuition—deduction possible?
Ans. A. P. 113, p. 4-5-6-7-8.
74—What preparation is necessary to receive intuition?
Ans. A. P. 114, p. 2.
75—Are intuitions—deductions—always truth?
Ans. A. P. 115, p. 4.
76—What is the caution test?
Ans. A. P. 116, p. 3.
77—What is our only channel of receipt of universal truth?
Ans. A. P. 117, p. 1, and 4 and p. 7.
78—Through what does universal truth come to us?
Ans. A. P. 117, p. 5.
79—What is premonition?
Ans. A. P. 118, p. 2-3-4-5.
80—What do we mean by memory—and what by impression?
Ans. Memory is to the mind what impression is to the soul.
A. P. 36, p. 4-5, and 37, p. 1-2-3. As to soul. 37, p. 4-5-6.
81—As to receipt of intuitions, what is our most important duty?
Ans. A. P. 118, p. 7, and 119, p. 6.
82—What is the rational attitude?
Ans. A. P. 120, p. 1-2-3-4.
83—What is the most prominent thing in all history?
Ans. A. P. 122, p. 2-3, and continuing to 124, p. 7.
84—What has been the mistake in the use of the word "healing?"
Ans. A. P. 125, p. 1.

85—Have all systems of so-called " healing " been related?
Ans. A. P. 125, p. 2, and 148, p. 1-2, and 149, p. 2-3.
86—As to quasi-religions of healing, what may be said of truth?
Ans. A. P. 125, p. 6-7, and 152, p. 5-6-7-8, and 153, p. 1.
87—What is the basis of the value of suggestion as applied to so-called healing?
Ans. A. P. 125, p. 4, 126, p. 1, and 127, to p. 6, and 149, p. 2, and 150.
88—As to the matter of faith, is the Christian Bible an exception?
Ans. A. P. 127, p. 2-3-4-5.
89—What is the relation to the value of suggestion in so-called healing of " works? "
Ans. A. P. 127, p. 6-7-8, and 129, p. 3 and 4, and 130, p. 1-2, and 149, p. 3-4-5, and 150, p. 6, and 151, p. 5-6, and 152, p. 1-2, and 150, p. 2-3.
90—Is suggestion the basis of all systems of healing?
Ans. A. P. 149, p. 1-2-3, and 152, p. 6, and 151, p. 3-4-5.
91—Is there curative property in medicine?
Ans. A. P. 150, p. 5.
92—How shall we remove faith in error or the influence of adverse suggestion?
Ans. A. P. 151, p. 1-2.
93—What is psycho-therapy?
Ans. A. P. 151, p. 6-7-8.
94—What is the limitation of healing by suggestion?
Ans. A. P. 153, p. 2 to p. 3, 154, and 159, p. 1-2-3.
95—As to suggestion, what mistake have all psychologists made?
Ans. A. P. 154, p. 3-4.
96—When is so-called healing by suggestion possible?
Ans. A. P. 154, p. 5-6-7, and 155, p. 2-3-4-5-6-7-8.
97—What material agency must convey the influence of a suggestion?
Ans. A. P. 158, p. 2, and 154, p. 5-6-7.

98—What can obstruct the transmission of the influence of a suggestion?
Ans. A. P. 158, p. 5-6-7.
99—What effect must follow occlusion of suggestion?
Ans. A. P. 159, p. 1-2.
100—What is the situation called that produces occlusion?
Ans. A. P. 159, p. 6, and 160, p. 1.
101—How may occlusion be removed?
Ans. A. P. 161, p. 5-6.
102—What is the science that furnishes the system to remove occlusion of the influence of suggestion called?
Ans. A. P. 162, p. 1 to end.

APPLIED PSYCHOLOGY

LECTURE NO. 1.
JUNE 11, 1913.

Basic Terminology

MY Friends, I am very grateful to you for your presence here this morning to listen to the beginning number of this course of lectures.

Psychology is always a subject of interest. It is a subject that grasps and holds the attention of the human family more than any other. Strange as it may seem, however, it has been a subject that has had the least definite, painstaking and careful study of all other subjects that appertain to human existence

I say, "strange to say," because at first we do not catch the importance of the thought that our recognition of intelligence began at the mortal end of living, and not at the psychic end. In other words, that the beginning phases of intelligence were closely confined to material existence and did not go far into things relative to the immaterial.

Any one would say at a glance that this was essential; that this was necessary; that evolution could not have been attained in any other way. All things that we do are done for a specific and definite purpose. The more we become evolved mentally and physically, the more we give definite, specific, and careful attention to all that we undertake to do.

The purpose of the study of Psychology is threefold. It is: FIRST—To inform us as to the material construction of the body; and relatively, as to the construction of all animate things or entities. This, of course, goes into consideration of brain, nerves and tissues generally, and this branch of study

has been incorrectly relegated to the studies of the doctor, the medicine man, the individual that sets himself up as a healer; as one giving definite, specific attention to the human body. ¶ This is not as it should be, and not as it will be, but is only incidental to the beginning phases of our evolution, and intelligence. *There will come a time when all human beings will study their bodies and will understand the relation of the Soul to the body as definitely as the doctor should, because they will know that it is an essential part of information, if they expect to acquire all that is best and highest in and for them.*

Second—We desire to understand what we can of Mind; and in the study of that we come again to a study of the brain, and especially the function of it that produces Mind, the scope of that function, and the capacity for impression, and the means and character of impression.

Third—We desire to know something of our Psychic existence, its scope, its relation, its continuity; that is to say, the length, breadth and depth of its existence, and to understand our means of ascertaining knowledge of Psychic existence at all; and to inform ourselves as to the value of Psychic things as they appertain to this living, here and now.

As to our knowledge of the Psychic, there have been very many different ways of study. Indeed, it has been incident to the history of human existence, this continual study of the Psychic. We have studied the Psychic in every period of which history furnishes any account. We have it as illustrated in the Christian religion; for at bottom and in the last analysis, Christianity is nothing more nor less than a mode of Psychic development, limited in its scope, but nevertheless —a mode of Psychic development.

All religions of which the world has ever given us any account, ancient or modern, have at basis, been the study of the Psychic side of existence.

That which has appealed to different peoples; that which has developed religious thought; that which has developed religious literature, has been nothing but that intuitive desire to study and to know Psychic relationship.

Spiritualists have studied this problem, together with, rela-

tive to, and co-existent with, all other forms of investigation. ¶ In its broadest and general sense, all forms of study of the Psychic include what we are pleased to call, in this modern day—Psychology.

All religionists, in the last analysis, have been learning what they could of the Soul. They have been investigating, in one way or another, the Soul, and therefore, our endeavors along this line, our purpose in this investigation, is to find out all that we may learn about the phenomena of the Soul, particularly because of its interest to us in this environmental existence; and the relative interest and value it may be to us in any other existence.

Clearly it is of the very first importance, in endeavoring to investigate a subject of this kind, that we shall have a general understanding of the terms that we are about to use ordinarily called terminology.

Every student that enters any school for the purpose of learning any definite branch of science, literature or art, first familiarizes himself, or at least should do so, with the terminology of that particular branch of information.

One of the things that is especially criticisable in our present advance toward intellectual effort and progress in that direction, is the fact that we have no definite way, in any of the great universities of this country, in any of the colleges or academies, of instructing students in terminology as a preparatory study to the further investigation of the educational phase they desire to develop.

It is bootless to say that an intelligent and comprehensive knowledge of the terminology of any subject must be acquired by any student before he can be versed at all in that particular thing. Therefore, if we hope to go far in this investigation of the Soul, we must have a terminology that we can use, and that we may all understand.

First of all, let us understand what the Science of Psychology is, and in the language of the Yankee, "in order to understand what it is, let us first understand what it is not." ☙ In the first place, it is not *metaphysics*. It is not *mental philosophy*. It is not the study of material. That is to say, the

Science of Psychology does not relate primarily to Mind, nor mental aspects. It does not relate to the body in any of its aspects. It does not relate to the physical or material, in any of their aspects.

Psychology is primarily a study of the expression of that immaterial, intelligent force, that we have learned to call the Soul.

¶ How shall we proceed to study this phenomenon? How shall we direct our attention to the Soul? We must study it from our present position. We *are* material beings. We are material essence. We have a Mind. We live, breathe, speak, act and are controlled to a large extent by the physical environment about us.

For the reasons stated we shall study the Soul:

First—through the function of the material body. This may not, at first, seem very clear to some of us; the meaning will be clear when the thought is developed.

Second—we shall study the Soul through the *Brain-Mind.* That is to say, through the *Mind-impressional,* or through the impressional aspects of Mind. In this way we shall arrive at some truth.

Therefore, you should understand that what we mean by the study of Psychology *is the study of the Soul, as it expresses itself through the physical.*

Then, what do we mean by the *science* of Psychology? And, first, what do we mean by the science of anything? There is a great deal of misunderstanding today among students, and in general as to what science is. I have defined that for you many times; those of you that have been here as students, but I shall define it again.

Science consists in the systematized and classified truths appertaining to any department of thinking.

You will understand, therefore, that science is not a generalization of opinion. It is not the consensus of opinion of a few individuals. It is the classification and systematization of truth relative to a given thing.

So long as statements in regard to anything are theories, they can take no part in a science. Only that can be part of a science that has been demonstrated, by the highest and

most approved methods, to be the truth. ¶ In passing, permit me to say that if the human family had a better and broader appreciation of what science is, there would be very much less difference of opinion respecting various questions that are now before us.

The Science of Psychology consists of the systematized and classified truths touching upon or related to the expression of the Soul, not the Human Soul but the Soul of the human. I desire you to understand that there is a very great difference between these terms. We are wont to speak of the Human Soul. *There is no such thing.* There is the Soul of the human being, but not the Human Soul.

Therefore, let us investigate this subject from the standpoint of an acquisition and systematization of the truths that are capable of demonstration with respect to the Soul of a human being

In the first place, in no other relationship of human existence, do we so fully come to realize our incompetency, our limitations, as when we attempt to discuss, in material language, the Soul; when we come to attempt to conceive Psychic things. Then, indeed, do we stand in the presence of that immaculate thing, as it were, with palsied tongue, *for in the Psychic realm there is no language that Mind is fully able to comprehend, or tongue express.*

But in an investigation of Psychology, in finding out what we know of it, in learning what we may express of it, we must either agree upon the terms that we shall use, or we must expect to be continually at strife and difference.

Language, whether English, Latin, Hebrew, German, French, or what not, is most remarkably limited and defective. *The best one may say of it, is that it is bound up in the limitations of material existence, and must remain so.* Language can never even be abreast of latest thought; but is always lagging behind with the stragglers.

Language, especially the language of science, is—after all, nothing in the world but a *matter of compromise;* a matter of *consensus of opinion;* a matter of *consent to call things by particular names* as they most peculiarly come within the

purview of the impressional sense, that we call intuition. ¶ However, when these things are considered as we are doing, at the beginning, of a discussion like this, they furnish means for an understanding, absolutely essential in order that all shall fully appreciate what is being said, and what is meant by what is said.

All our woes, all our sorrows, all our differences in the general subject of religion, in our concepts of humanity, in all our Psychic relationships of life, grow out of our failure to understand each other when we talk; grow out of the fact that we are separated by linguistic misunderstandings.

We are incomprehensible to each other because we have no language medium by which we may be understood. Therefore, as we proceed, we shall attempt to establish at each step a terminology about which we agree. At least, the lecturer will present to you his meaning of each term that shall be used, so you need not be at difference with him; provided you will tentatively consent to the meaning that he presents.

Having reached the place that we understand what we are about to take up, that we are undertaking to construct or review the Science of the Soul, the very first question that presents itself to us is: What is the Soul?

The word Soul has had more common use, I presume, than almost any word in our language. You may read the most ancient literature, you may even go back to the hieroglyphics, and you will find that the human family commonly used the term Soul. It was one of the most common words. It has been one of the most common words and has been a part of language so long as there has been a fragment of history of human beings; and yet, today, there is a wonderful distinction and difference, and probably an irreconcilable dispute, as to what this word really means.

You can understand that, what the word Soul really means is only the consensus of conception regarding it, of the members of the human family using the word.

The word Soul was not furnished to us originally. It was invented. It is a product of imagination. It came into being by an attempt to express a thought that had welled up, as

we say, inside of some human being; until by the urge, he became physically able to form a syllable that gave meaning to his thought, and others about him grasped that intuitive sense and joined him in that thought.

So the word Soul grew; but because this happened at different places on the earth's surface, a discrepancy, a difference with regard to it, came into existence, and when the people that grew up in these forms of imagination came together and began to use this word in common, they discovered that there was a difference that they could not reconcile; because, incident and relative to all imagination there is prejudice, the desire to maintain that which has been imaged, rather than a desire to listen to, hear and understand that which others have evolved, or even what is true.

Now let us review, for a moment, the various concepts that are held as to the word Soul.

Ancient religions all have words that mean the same thing as *Body* and *Soul.*

All primitive people, in all parts of the world have these two terms, *Body* and *Soul* or *Spirit.* The savages that once lived where we are now used terms that indicated the same as these words

The uncivilized people of ancient times used words that indicated *Body* and *Soul.* In the jungles of Darkest Africa today, where white men have only recently ventured, they find that the people living there have the concept of *Body* and *Soul.*

Christians generally, the world over, use terminology that indicates *Body*, *Soul* and *Spirit*, the belief in the triune.

Spiritualists, in general, the world over, use the terms, *Body* and *Spirit*, and this is not intended to mean that they conform to savagery. It is only their form of concept, generally, as touching the human being in this particular respect. However, justice dictates that I should say that the more eminent authorities in spiritualism believe in the triune, and include the *Soul*

Psychologists, should at this time, conceive it in this form: *Body*, *Mind* and *Soul.*

For the purposes of this course of lectures I wish to say that I shall apply this last order of statement as meeting definitely the results of our most recent demonstration, *Body*, *Mind*, *Soul*. These are stated in the order of our investigation; but in the order of their manifestation and power they should be stated, *Soul*, *Body*, *Mind*.

We find that in development we began with the Body; and a little more removed from the material we recognized Mind, and going still further into the unseen, we recognized Soul. As to the last we desire to make inquiry. What do we mean by the Soul?

We mean that the Soul is the indestructible part of a human being; that which we *cannot conceive can die;* that of which we *cannot express death;* that which, try as we may, we are entirely incapacitated to imagine *can pass out of existence;* the first cause of *individual being*, because it stands as the immediate cause of that which we know as *separate existence*, that which we conceive to be the *core*, *the life*, *the intelligent force*, *causing* all animation that we are capable of witnessing or realizing as taking place.

We should go further and state the conclusion at this time that the Soul is that *somewhat of life* that stands between *material man* and *his Creator*, *related to both*, *necessary to both*.

¶ So far as our individual considerations and investigations are concerned, we should take up a very pertinent question at this juncture of agreement of terminology.

Has the Soul a Mind? Again this strikes at once at the root of the doctrine of metaphysicians—mental philosophers, because, if the Soul has not Mind, then, of course, all that they have said, with relation thereto, is as naught. Hence, this is a very pertinent inquiry to us in all Psychic research and investigation.

It has been the concept of all so-called psychologists up to this time, that the Soul is possessed of, or is Mind; and this, undoubtedly for the reason that they have observed the transmission of intelligence, from which the idea of Mind is difficult to separate. They have, therefore, inadvertently held the unjustifiable position that, in the radiation of intel-

ligence, the Soul is thinking, and is therefore possessed of Mind ☙ ☙

This position is not so strange when we remember that *all knowledge originally came into recognition through the process of imagination, and that imagination is the human side of intuition.* That is to say, *imagination* sustains the same relation to *Mind* that *intuition* sustains to *Soul.* Imagination, however, requires *activity* of Mind, while intuition only requires *inactive reception* by the Soul of the human being from the Great Soul.

In this connection it is well to remember that it is quite immaterial what we may believe dogmatically as to the thought: "Angels are hovering near." It is quite immaterial what our experience has been as to the transmission of intelligence by decarnate souls; it is quite immaterial how complex and intricate, or even mysterious, the experience of the human family has shown the transmission of intelligence to be—*yet the fact stands out clearly that all we know has come into human cognizance through the medium of imagination.* It makes no difference how many million times it may have been transmitted since it originally came; that does not change, nor influence the channel or mode of its coming. It must also be remembered that *the Soul's only relation to the transmission of intelligence is the radiation of the substance of it to memory.*

Soul has been confused with Mind, because, forsooth, *the Soul is intelligence.* It has been referred to as Mind by substantially all psychologists, because the Soul is the immediate source of our intelligence. Yet you can understand that these erroneous conceptions present no argument, tending to sustain the theory that the Soul is Mind, or has Mind ☙

Now what are some of the erroneous terms that have been used by psychologists to express their thought? For, by examining the erroneous terms, we shall be more able to grasp the terms that should be used.

You will find in history and literature, relative to Psychology, such terms as " subconscious mind," " subliminal mind," and " subjective mind."

What is the objection to all such terms? The first objection is that all such terms declare the Soul to *have a Mind.* While the reference in all such terms is intended to be to the Soul, in reality it is to Mind, and before it will be proper to use such terms in referring to the Soul, it must be established that the *Soul has*, or is, a *Mind*, and since it clearly appears that *it has not, and is not, all such terms should be abandoned.*

The second objection to such terms is, that they indicate that Soul is *less than Mind*, for with each term there is the use of "sub," which means under, less than, or below, and surely no psychologist, no human of ordinary intelligence, would ever be willing to concede that the Soul is less than Mind, for it must undoubtedly be true, if all intelligence is transmitted to us by intuition and recognized through the process of imagination, that the Soul is *parent to Mind*, and as such must be *superior* to it, so the term "sub" in this connection is wholly incorrect.

But the last and most potent of these objections is that such terms are too incomprehensive to express what is intended to be conveyed. All of them indicate this phenomenon as being subject to, less than, or incidental to the Mind of man, *the function of the human brain.* This is a conception which, when viewed in all its nakedness must, at once, by its very terms, be abandoned by each individual.

We must, therefore, apply some term to the Soul that relieves it of this relationship, *this subjectiveness to Mind*—and for this purpose it can be referred to as " intelligence," as " power," as " psychic intelligence," or by any term which, in itself, stands alone and related to nothing that carries with it *material limitations.* We will understand when we are talking further in this particular, that when we use the words "intelligence," " power " " psychic " we are referring to the Soul.

¶ As psychologists, when we use the word " Soul " we simply refer to that *non-seen, intelligent entity* that we conceive to be the *primary individuality;* that is *superior in all things* to that which is *material* and *limited by the material.*

By way of further inquiry, if what has been described is the Soul, then what is Mind? For we must take these steps in the

order in which they come. *Mind is a function of the physical brain* ☙ ☙

That brings us to a consideration of what is meant by a function of the physical brain. Of course, students of anatomy and physiology will readily understand the statement, when we say that the brain, acting as an anatomic and physiologic organ, in some way *produces Mind as a part of its operation. In other words, that the brain, or the portion of it, which is constructed for that purpose, in its operation produces Mind, just as all other organs of the body perform their functions, and produce the results they are constructed to accomplish.*

It is not hard for us to understand this when we refer to any other phase of functional existence, because we have learned, through long years of folk-lore, to understand, in an indefinite way, that the action of the heart, the action of the lungs, the action of the stomach, or the action of any other part of the body, just takes place; that it is just a very common, ordinary affair; that there is nothing difficult, whatever, to understand about it; that it is all material.

This is the general concept—the materialists of the world have taught us that these things are accomplished by power that emanates from material; that they are performed by a sort of disconnected but relative chemistry. They do not seek to give us the cause of the operation of those chemicals and their elaborations. They do not seek to tell us how these operations are performed, but only give us to understand that they are simple, common and sublunar; that anybody ought to understand them. *As a result, children with their wonderful imaginations, and their uninstructed Minds, grasp the fantasy that these things are easy to understand; never give the subject any more consideration during their lifetime and, therefore, continue to think that the functional activities of the stomach, heart, lungs, etc., are just simple physical operations and that everybody understands them.*

However, I wish to interpolate this: The function of the heart is just as difficult to grasp, to know, and to consider as is the function of the brain in that part of it that produces Mind. The function of the lungs, by which they take in the

atmosphere, transmit certain parts of it to the material elements of the body, and in this way act and produce gaseous compounds, is just as difficult to understand as that the brain, in its functioning, in certain parts of it, produces Mind.

It is just as difficult to understand how the stomach receives and retains elements taken from the extraneous environment and delivers to them, from its walls, substances of chemical consistence that will disintegrate and preserve and free the elements contained in the ingested substances, thus furnishing the elaborations out of which the organism, by further processes, may be built.

When we stop to think of these things and think of the awesomeness of them, we are simply stricken modest, because at once we know that in each of these wonderful functions we are standing in the very presence of eternal formation, because, in considering each of these functions, we come to know that it is as *utterly impossible for us, through our material essence, to understand how the stomach functions, as it is to understand how the brain functions, and in functioning produces Mind, with its attributes, memory, sensation, consciousness, reason, passion, love, will, etc., and all the wonderful phenomena that appertain thereto.*

So that, although it is somewhat difficult to understand, yet, by having striven for it, we have obtained a very complete congeries of phenomena regarding brain function in this respect, which leads us to know that *Mind* is, after all, nothing more nor less than a *function* of the physical brain.

Now what is the *primary office of Mind?* Can you understand that when Mind was produced it was produced *primarily* for the *use* of the Soul? If the Soul had had no use for Mind it would not have produced it. If it had had no use for Mind, in an individual, it would have made the brain and constructed it to have gone on performing all of the offices necessary without that one remarkable function—*Mind.* The Soul, having produced *Mind* as well as *all other functions* of the human organism, for its use, continues to use it and them ❧ ❧

The primary use of Mind in a human being is to receive intelligence from the Soul. This is called impression. Memory could not be established without impression. The intelligence received constitutes the substance of memory. It is impressed by the primary individuality—the Soul—upon a *part of the brain* to *constitute memory, consciousness*—the basis of Mind.
¶ Incidentally, impression is accomplished by the same force and in precisely the same way in the brain to produce Mind, that, acting through the brain and nerves, produces the impression in the walls of the stomach, causing them to produce the elements necessary for digestion; the impression to the tissues of the lungs, causing them to produce respiration, and thus to receive atomic elements of the atmosphere and convey them in proper solution to the various liquids of the body, and then causes them to continually enter into the construction of the organism.
The production of Mind as a brain operation is no more wonderful than the function of any of the various organs of the body, and is performed in exactly the same way, for you understand *that the Soul, back of the body, as easily, as readily, and as necessarily, impresses the intelligence upon each atom of us to perform its office as it impresses upon the substance of our brain the processes of Mind.*
Since servitude to the Soul is the *primary* office of Mind, and it is the primary office of Mind to receive intelligence from the Soul, *it is then the secondary office of Mind to receive, through its five senses, information as to the physical environment, and to convey that information to the Soul.*
The Soul, you can understand, without this mind office, would be absolutely sight-less, smell-less, taste-less, hear-less, feel-less. That is to say, it would be without a single avenue by which it could receive any information as to this environment
If it were not for the fact that it is the secondary office of Mind to receive information from the material side and to convey it to the Soul, *the Soul of man would never be advised of man's physical existence, for the Soul would have no avenue through which it could receive that fact.*

Mind has been referred to in many terms by psychologists. It has been suggested that it is the "objective" Mind, the "active" Mind, the "environmental" Mind, the Mind with some sort of limiting or qualifying adjective used in relation with it. Why should this be? Why should it ever have been? When you have used the word—*Mind*—you have used the most comprehensive term that you can use with respect to the human being, you have comprehended all that appertains to his intelligence materially; and when you have said—*Soul*—you have indicated all that appertains to his intelligence Psychicly. *When you have used these two terms, you have said all, with regard to the intelligence of a human being, that can be said.*

As to the two phases of man's intelligence, in the further discussion of this subject, when I refer to the channel of original intelligence, you will know that I mean the Soul, and when I refer to Mind, you will know that I am referring peculiarly and specifically to that *function of the brain.*

My friends, in closing, permit me to say that my remarks have been necessarily academic. They have been necessarily involved in terminology, and much of this discussion may have been dry to you, but it has been for the purpose of giving you an avenue of terms through which you may understand all that I shall say in the further discussion of Psychology.

In closing, let me remind you of a wonderful fact—that it is possible to keep your Mind open and ready to receive at any time this immaculate intelligence, coming at once through that individual center, the Soul, and beyond that, from the Great Soul of the Universe.

LECTURE NO. 2.
JUNE 12, 1913.

Attributes of the Soul

MY FRIENDS:—We desire again to pursue our investigation for the acquisition of knowledge relative to the Soul of man, and by way of

RECAPITULATION

I wish to say that the principal things we learned in the preceding lecture are that the Soul is the essential, indestructible part of man; that part of the human being which we cannot conceive can die; the primary individuality.

We found that Mind is a function of the physical brain, and that its primary office is to receive Soul impressions, and that its secondary office is to transmit information from this environment, or physical relationship, to the Soul.

We found that the Science of Psychology is the classification and systematic relation of the truths of the Soul, as they are expressed through the physical. ¶ The subject for this morning brings us to an investigation of phenomena, the most remarkable that are within human capacity to consider

ATTRIBUTES OF SOUL

In attempting an investigation of this kind we are first confronted with this important and vital question: How are we advised of the Soul—what means have we for knowing anything at all about the Soul? I am aware that it is a matter of common thought, that in some peculiar and indefinite way, that it is not necessary to consider; we have knowledge of the Soul

Most people rely for their knowledge of Soul upon *what is told them*, and they do not think that, in itself, constitutes anything remarkable, or requires them to make any particular

investigation of the means of knowledge; but it will at once be apparent to the inquiring Mind that there is a way by which we have knowledge of the Soul, through which we can make inquiry; and if that is not a specific and reliable way, then our belief is unsupported and perhaps does not amount to knowledge at all.

It is very clear that the only means that we have of investigating the Soul is through the medium of Mind. Indeed, regardless of how much information, power, etc., our Soul may possess—so far as we, as individuals are concerned—our knowledge of it can only be commensurate with the acquisition of our Mind.

In brief, all inquiry must be prosecuted, all phenomena taken note of, through Mind; and through that medium we must estimate, we must weigh, we must measure, we must ascertain the height, breadth and depth of human conception of the Soul.

We must, therefore, make some investigation of Mind before we are prepared to investigate the Soul, for it is very clear, as an introductory proposition, that Mind stands on this side of Soul; that Mind is the initiative agent through which we must act, and by means of which we must accomplish all investigation ☙ ☙

It is very apparent that any individual in attempting to handle any piece of machinery must understand it. You would not think of attempting the simple matter of running an automobile, a self-binder, a washing machine, or even a tub and wash-board without having a full and comprehensive knowledge of the machine that you are about to operate ☙

It is of the first importance that we shall know the fundamentals of Mind, in order that we shall be able to follow out, scientifically its comprehensiveness, its deficiencies, its scope, its limitations and its abilities.

Now in the first place we are overwhelmed with the proposition that Mind is capable of being utterly and absolutely destroyed. Therefore, we are at the first confronted with the phenomenon of the frailty of Mind, with the fact that it is of the earth, earthy; that Mind exists only when the

machine, the brain, of which it is the function, acts in such manner as to produce Mind; but if that machine is not normal, then Mind is in ratio lost, and when that machine is so abnormal as to cease to produce it, then Mind is gone—is utterly and absolutely lost.

This is also true, if that part of the brain which produces Mind or should produce it, by its proper function, is not developed by formative energy to a sufficient degree of perfection to produce the processes of Mind, which condition it is safe to illustrate and to understand in what we call idiocy.

¶ We also observe this phenomenon in that phase, under as many names as you desire to follow out, properly classified as brain degeneracy, or softening of the brain, and by these means Mind may also be wholly lost; which proves to us in the beginning, the instability of Mind.

As to its operation, Mind is possessed of certain attributes, each of which indicates limitations; each indicating that it is peculiarly of this environment, or does not transcend the physical relation; does not in any respect, transcend the laws of physical being. That is to say, *Mind had the power to conceive the existence of circumstances, that may or may not exist.* This is the operation called imagination. *It is also, the operation of induction. It is limited to physical capacity and material frailty* ❧ ❧

Mind has reason—comparison. For reason consists in comparison. Reason consists in taking that which we know—and comparing it with something else that we know; or taking two things that we know and by comparison and imagination, inducting a proposition that we may or may not have known before, and that may or may not be true. Therefore, *reason consists wholly in comparison, aided by imagination;* and *reason is peculiarly a mental trait, an attribute of Mind* ❧

Mind is capable of performing deduction, the means of accomplishing intuition. That is to say, translating intuitional impression. More of this later. This, in passing, I desire to say, *proves Mind's relationship to a Power that is superior to it, and that causes it to be.*

Now Mind, with its attributes, presents for our consideration

a dual aspect. In the first phase, it is limited to physical existence: and in the second phase, it presents an attribute not physically limited—the capacity for deduction—intuition.
¶ Mental philosophers have undertaken to make a difference and distinction between deduction and intuition, but there is nothing to the fancy whatever. *Deduction is the mind phase of intuition.*
Inductions are always limited in their correctness to the power of Mind to comprehend the subject to which it is directed; are limited by the power of Mind to fully compare, to completely inquire into; to exactly imagine; and Mind thus failing in comprehensiveness, generally fails to take into any single consideration all of the elements necessary to it; and therefore, *inductive conclusions are substantially always erroneous* ☙ ☙
This limitation of Mind accounts for the fact that the vast lore of human thought, the great tomes that are laid away in our libraries, reek with junk of an intellectual character, simply because, as I have said, all information has come into cognizance through the avenue of imagination; and the human family has not yet learned much deduction.
The human family has not learned the *frailty of induction.* It has continued to induct propositions, which it chooses to call theories. It has chosen, by the processes of induction, to construct thought castles, which may or may not be supported by any truth.
Information is only such as Mind can obtain by the process of inquiry. In other words, that which we think we know, we have been compelled to learn by inquiry.
We come into this world *without any Mind knowledge at all.* We instantly begin a process of inquiry. We instantly begin to *store memory to produce knowledge.* We instantly begin image-ing and it is a trite saying, " the wonderful imagination of the child." The reason the child is possessed of a wonderful imagination is because he has so many things about which he must inquire. He has not yet learned his limitations and in his struggles to know, he is rife with imagination.
As the years go by, and as by experience the *individual*

becomes wiser, that is to say, as by experience he comes to know better and better his limitations, he ceases more and more to revel in that form of inquiry which we call imagination; and learns more and more to use that quality which we call reason; that is to say—comparison of all that is presented to him *by and with those things which he has imaged and that he has come to believe to be true.*

The principal attributes of Mind are limited to that which is imperfect. Instead of using the word " principal " perhaps I should say the greater number of the attributes of Mind. However, I mean principal attributes considered from the number of attributes, and these are peculiarly prominent by the fact that they are limited to physical existence, and that only

How shall we test the attributes of Mind? How shall we proceed mentally to inquire into and test whether these attributes are limited or not? There is but one way that this may be done. It will be seen at once, that in order to test an attribute, we must try to conceive whether or not that attribute could be perfected. That is to say, whether that attribute, no matter how weak it may be in its manifestation, could be multiplied to perfection; could that particular attribute, by any process of addition, be conceived to become perfect? That is the test of the value of each attribute; and that is the test also of whether it appertains solely to physical existence; or whether it is superior to environmental existence.

¶ Now, let us see by this form of inquiry, which of the attributes of Mind may be added to until perfection is reached. That is to say, let us see which of them may be perfected—which of them it would be possible to perfect.

We shall begin with that attribute—*reason*—about which so much has been said, and go on through the list.

Reason—The pseudo-scientists of the world have run mad on this subject. Reason has been exalted above all other attributes. Students of our great universities and colleges have been taught that reason is the most superior quality that may be possessed.

Each individual that starts out with the ambition to acquire

learning, becomes exceedingly proud of the fact that he is learning " to reason." He longs for the accomplishment of that dream. He struggles for that chimera day and night, seeking and struggling to know how he shall increase and perfect his reasoning qualities.

Now, let us see! Can reason be made perfect? What shall reason be compared with in the last analysis? If knowledge is perfected, where is the scope for reason? So soon as an individual arrives at knowledge in any respect, he ceases to have power to reason on that thing, because there is no possibility of comparison; and without comparison there is no reason. So we find reason is limited to Mind—Mind that cannot know perfectly, that must be limited in the scope of its knowledge

Imagination—If one had perfect knowledge, what would be left for imagination? And to perfect imagination would be, to make it possible to do what? It cannot be conceived. One cannot think of a perfect imagination; because the very thought immediately brings to Mind the barrier—perfect knowledge, which would leave no room for imagination; would leave nothing to be *imaged* about.

Ambition—Could you have perfect ambition? In the last and ultimate in omnipresence, omnipotence and omniscience there would be nothing to acquire, and therefore, nothing to be ambitious for, so that ambition is impossible in the last analysis

Pain—In its ultimate analysis is annihilation. Therefore, it could not be perfect. You could not experience perfect pain.

Anger—In its last analysis is destruction. Therefore, you could not perfect anger.

Hate—In its last analysis is destruction. You could not perfect hate.

Jealousy—Is destruction. You do not have to wait for the last analysis.

So you see Mind, in its principal attributes, is limited to imperfect concepts of a purely mental, physical, limited existence. But Mind has other attributes, and these may be raised or multiplied to perfection.

Mind has *presence*, which, multiplied to perfection, is *omnipresence, or all presence*, Mind has *power*, which multiplied to perfection is *omnipotence, or all power*. Mind has *knowledge*, which, multiplied to perfection, is *omniscience, or all knowledge*. Mind is capable of *love*, which multiplied to perfection is *perfect love, or creative intelligence*.

These qualities prove that Mind is the product of, and is related to the Soul of man, provided we can first prove that the Soul of a human being is possessed of these qualities in greater degree than Mind and that the Soul is not possessed of any physically limited attributes.

This brings us to a consideration of the attributes of the Soul; but first, for the purpose of clarity, to a consideration of attributes which the Soul does *not* possess.

I cannot refrain, at this point, from suggesting that the fact, that the Soul has not these attributes, has had small influence upon the human family, because it is the general and common conception that the Soul does have these attributes, and yet it is self-evident, and its most profound argument is its simplest statement, that the Soul is incapable of possessing either potentially or otherwise, any of the qualities that I shall name.

The Soul is not possessed of the quality or attribute of reason, *because it has not the power or quality of inquiry*. It has not the power to compare. It only knows. It is intelligence, and being intelligence, it does not function as does Mind, but just knows. It just has intelligence; it just receives and transmits information. It as readily receives a falsehood as the truth. It knows no difference between a lie and the truth.

The Soul is utterly and absolutely without capacity to reason: First—because the Soul is not of the earth, earthy and therefore is *not bound by the limitations of that which is material*

Second—because the Soul is potentially like an Intelligence that cannot reason, *because it is omniscience*.

The Soul does not have imagination, because that requires inquiry—investigation. It is without the capacity to perform that function. It is incapable of being destroyed. Its existence

is eternal. Its maintenance is provided for. ¶ There is absolutely nothing the Soul can acquire, and therefore, it is *utterly and absolutely without the power or quality of ambition*, existing without the necessity of acquiring anything.

The Soul is utterly and absolutely incapable of pain, anger, hate, jealousy, or other limited attributes, because all tend to destruction, and *its life is eternal. Its power is potentially absolute. It is incapable of death.*

This brings us to consider those qualities of the Soul; those attributes that are capable of being multiplied to perfection, if it is possessed of such, and we find that it is.

Soul has presence, and therefore, has potential omnipresence. It has power, which I have told you is telekenetic, or kenetic energy, and this, multiplied to perfection is omnipotence. It has knowledge, and this, multiplied to perfection is omniscience. And it has the quality of love, the potential quality of perfect love, which, multiplied to perfection is original formative intelligence.

And I have learned, while developing the Science of Chiropractic, that, as remarkable as it may seem, the Soul is constantly forming or reforming the body, and must continue to do so *until adverse anatomic, or chemic circumstances shall render that no longer possible.*

If each of the attributes just named were multiplied to perfection, they would constitute the Great Soul of the Universe—the God. Therefore, we find the Soul of man is possessed of the potential attributes of God, and that the Soul produces for itself Mind, upon which it impresses the same attributes with less capacity, I grant you, but nevertheless, it has implanted them there for the use and glory of man, in that they prove his relationship to the God—his Creator ☙ ☙

I think there is no individual that would question the fact that God is omniscient, omnipotent, omnipresent, and possessed of love in its perfect sense, or formative power; that God is all these in perfection. All of our ideas of perfection are drawn from our conceptions of God. Outside of our thought that God is perfect, we know no thought of perfection. *We*

are utterly incapable and incapacitated to conceive perfection disrelated from the God of the Universe.

I think it will follow as absolutely conclusive, by the simple and wonderful process of deduction—which is the intuitive conception of universal law and nothing else—that the Great Soul, having these four qualities I have named, in perfection, is not possessed of other attributes. That is to say, *the possession of these four attributes in their perfection, comprehend the universe and leave no room for attributes necessarily less and opposed in their nature.*

It is inconceivable that God could be possessed of reason. God's knowledge is perfect. There is nothing in the universe God does not know. God could not imagine, because all things are already imaged.

Being perfect there is nothing to which God could attain, and therefore, ambition is an impossible thought with relation to God.

There is nothing for God to be angry about, because anger results only from the recognition of inability, shortcoming, incapacity, and therefore, the conception is impossible ☙ God could not hate, because hate is based upon a lack of comprehensive knowledge.

God could not suffer, because pain is only the result of improper action, and having all of the qualities that I have mentioned in perfection, God could not act improperly. ¶ God could not be sorrowful, because sorrow is the recognition of shortcomings; the recognition of something that is about to be done that we do not want done, or something that has been done that we did not want done; the recognition of incapacity, which cannot be ascribed to God.

Jealousy indicates a lack of perfection, a lack of knowledge, a lack of confidence, an unqualified fear of possible loss or a doubt concerning possession which cannot be ascribed to God ☙ ☙

The fact that God is not possessed of these qualities, but is the perfect qualities—is omnipotence—is omniscience—is omnipresence—is formative love—is creative intelligence and power, proves that the Soul of man is the product of the

Soul of the Universe, and that it is potentially like the Great Soul, and is related to and is of the Great Soul.

Now there are some simple lessons that we should learn from these facts, for without the lessons which apply to us in our everyday walk and conversation, investigation of a subject of this character is absolutely without value.

We should learn the far-reaching and comprehensive fact, which all must come to realize; that the Soul is not possessed of the power to reason. It is incapable of determining in any manner whatever, truth from error, and therefore, the Soul reflects to us every instant of our existence the error that we have permitted to be transmitted to and impressed upon it.

¶ It must be remembered that from the God side the Soul only receives impressions that are immaculate; but that from the earthy or environmental side it continually receives impressions true and false as they come.

We must not forget that we would never have an incorrect or erroneous conception if we constantly brought into our Minds and translated into our thought and walk and conversation nothing but the truth that is continually being transmitted to us from the God side of our Soul.

We must keep conscious that our errors; our shortcomings; our failures to accomplish, our failures to do what we should do, occur because we have permitted to be transmitted through our Minds to our Souls from earthly conceptions, error and untruth.

It is because of these erroneous transmissions that our physical bodies have suffered throughout the ages of history, and before histories were written. From these false impressions the physical body has suffered anatomically; that is to say, as to its structure; physiologically, that is to say, as to its function; hereditarily, that is to say, by inheritance from ancestors that have erred preceding us.

Mind production has suffered thus, suffered and will continue to suffer until we have unloaded from the process of Minding, the burdens of error; until we have so arranged it that there is a stream of unbroken truth, coming from the God side, and also from the earth side, and being translated into

the warp and woof of our beings. ¶ We must know that till such time we will be obsessed by all phases of insanity, occurring under those names that are commonly known and recognized in therapeutic terminology of disease, and under the additional names of fear, anger, hate, sorrow, jealousy, and all other attributes, which, in themselves declare that they are solely and only of earth environment. The great lesson, therefore, for each of us to learn is, that Mind should stand, like a *sentinel* at the gateway to the Soul, and continually watch that nothing shall enter therein but absolute, immaculate truth, in order that our Bodies and therefore our Minds may continue to develop in harmony, with that which can be multiplied to perfection.

LECTURE NO. 3.
JUNE 13, 1913.

Suggestion—Defined—Applied

MY FRIENDS: Suggestion is one of the important subjects of this, and all times, but before we take up that subject here, let us review a few of the thoughts of the previous lesson, and by way of

RECAPITULATION

We found, by the deductive process used, that a human being is possessed of Mind, the greater number of the attributes of which proclaim it to be limited to physical existence. But we found Mind also possessed of qualities that proclaim its relation to the Soul, because such qualities are capable of being perfected.

We found the Soul to be possessed, only of attributes that may reach perfection, and by this process of deduction we reached the conclusion that *the Soul is not human*, but is related to, is of, and is like the Great Soul, which is perfect knowledge, perfect power, perfect presence, and perfect love, or formative intelligence.

We learned that the *first* office of Mind is to receive Soul impression and translate it into thought and language; and that it is the *second* office of Mind to inquire into physical things, receive earthly information, and to transmit the same to the Soul, and translate such information for the Soul.

These deductions have brought us, step by step, to the subject of the present lesson.

SUGGESTION

Generally speaking, the world at large has a very inadequate knowledge of suggestion. It is the general concept that when one speaks of suggestion with relation to Psychic subjects, he is talking about something mysterious and occult; that he is

referring to something that is apart from the usual—ordinary, and in the sense that we have learned to use the term—common ☙ ☙

That is not true. In all the intelligent relationships of man, there is nothing so absolutely common and general as suggestion. It is suggestion that we come in contact with upon our first entrance into this environmental existence, and suggestion is the last recognition we have of this material existence, when its shadows are about to close upon us.

Suggestion is commonly held to be not only mysterious, but to be a circumscribed and limited thing, used very seldom, and then only by a very peculiar set of professional people, and that it does not apply to our everyday thought, conversation and life. No concept could be more erroneous.

It is also thought that, whenever there is an endeavor, an effort to suggest, suggestion is accomplished. This is also erroneous—as erroneous as it is possible to conceive.

Speaking from the standpoint of Psychologic things, *a suggestion is the transmission of intelligence through the Mind to the Soul, in such manner, that it is evolved into cognizance* ☙

From the standpoint of biologic things with reference to human beings, suggestion is the unconscious transmission of intelligence, from the material being to the Soul and the conveyance of intelligent energy from the Soul, through the nerve system, to all parts of the organism.

It will be understood that suggestion has many and varied aspects; many that ordinarily we have not paused to consider; many that we have not thought of; and many that we have not attained the basis or preparation to think about.

¶ First—I desire to call your attention to the most wondrous phenomenon—the transmission of intelligence from the *tissue elements*, or *cells* of the *body* to the Soul. This phase of intelligence in passing through the brain may produce consciousness of its substance, or it may only produce vibration, in cortical areas not constructed for the production of consciousness.

Now I am sure that each auditor this morning knows that the body is composed of tissue elements, that we may call

cells; that all animate cells are in relation with nerve ends that at the other end extend from the brain, and that in some way—of which we are only intuitively cognizant—the Soul is in immediate relation with the *brain end of all nerves*, and that through and by means of this wonderful machinic relationship each element or cell of the body—so long as it is normal or approaches the normal—continually suggests its condition and the relationship it sustains to its fellows, to the Soul.

I wish to impress you, if I can, with the wonderful value of this thought, in relation to the strength, health and vigor of your Body, and to an understanding of your adverse physical conditions and mental processes.

¶ Second—Suggestion consists in the transmission of any form of intelligence, extraneous to the Body, *from the physical environment to the Soul.*

It will be seen that we obtain general information of our environment through that department of transmission, which we call *common sensation* or feeling.

By common sensation we are also apprised of irritation, that is to say—application of any form to our bodies, or through our bodies, in such manner as to cease to be pleasant.

Irritation, of course, might be common sensation produced in any manner, but is here more definitely referred to atmospheric disturbance, such as cold, heat, dry, wet, and to the various other things that we can feel.

Then, as to the other forms of feeling—*special senses*, as we are pleased to call them—to take them out of the category of the ordinary—we have that wonderful vibration of the optic nerves and brain which reaches the Soul in the form of that suggestion that we call seeing; another vibration, as marvelously performed, through the auditory nerves and brain, reaching the Soul in the form of that suggestion that we call hearing; still another phase of vibration, reaching the Soul through the olfactory nerves and brain in the form of that suggestion, we call smelling; and lastly vibration that reaches the Soul through the gustatory nerves and brain in the form of that suggestion, we call tasting.

And still further, by combination of these senses we have conveyance of specific suggestion by affirmative signs, such as: gestures, facial expression, signs, tokens, representations, etc., all of which require, on the part of the individual receiving the suggestion, the use and operation of that wonderful department of intelligence called memory.

Of these signs, tokens and symbols, I desire to call attention especially to that called writing or printing. I am certain that very few individuals think when they pick up a book, a periodical, or any kind of written or printed matter to read, that they are preparing themselves to receive suggestion, and yet that is true. This is no less true of the examination of pictures, signs or tokens of any kind.

Again we have suggestion, conveyed through the immaculate medium of speech. This requires the use of practically all of the senses at the same time; and is *immaculate*, in that *human beings* are the only creatures that are able to perform the wonderful phenomenon speech, in the transmission of *independent intelligence*.

The lesson we are to learn at this juncture is, that all these wonderful phenomena fail of their office; and cease to arise to the dignity of suggestion, unless intelligence *reaches* and impresses itself upon the *Soul understandingly;* and *in such manner as to be evolved into the realm of consciousness*.

As to the application of suggestion, beginning from the *least* and going to the *greatest* I would remind you:

First—That the power of suggestion is the one and only means that we have for building that wonderful agent that we continually use, called memory. Without suggestion it would be utterly and absolutely impossible to establish memory. I cannot pause to illustrate the building of memory by suggestion; but only wish to say that this method is most appropriately applied to children of all ages, from thirty seconds to seven hundred years or more—if such age is attained ❧ ❧

Second—Suggestion is exceedingly important for the transmission of intelligence from an individual's Mind to his Soul, and than this phase of suggestion there is no more

valuable office in our everyday walk and conversation. In the Science of Psychology this phase has received the name, auto (self) suggestion.

A great many people think that in order to use auto-suggestion, they must sit in some quiet place apart; that they must go into their closet and close and lock the door; that they must pull down the shades of their bedroom windows and go into "the silence;" that they must withdraw themselves from the busy world, all of which is amusingly erroneous. My friends, there is not a moment of our waking hours that we are not busy with the transmission of suggestions to self ❧ It is an utter impossibility to check the stream of auto-suggestion that is constantly reaching your Soul through your Mind. Therefore, when we speak of auto-suggestion being the most wonderful means for individual improvement we do not mean that you shall suggest more to your Soul, but that you shall only suggest that which is fit and proper; that you shall make your Mind a winnower of that which shall be transmitted ❧ ❧

THIRD—Suggestion is used for the communication of intelligence from the Mind of man to and through his Soul to the Soul of his fellow-man and thence to his Mind. We are wont to think that we talk to each other from head to head; that we talk to each other from Mind to Mind; but that is not true. When we give a suggestion to another—if that suggestion is received—that result demonstrates *the transmission of intelligence from the Mind of the suggester to his Soul, and thence to the Soul of the receiver, in such manner as to evolve and be impressed in his Mind as consciously or unconsciously produced memory.* If consciously produced it is a present reality. If unconsciously produced it remains and *may evolve* into consciousness, as though an independent recollection or original thought.

Now incidentally, and as an important lesson, this must be remembered: *the Soul always radiates to Mind all Great Soul truth and information generally, that Mind will receive—and always gives back to Mind, everything exactly as the Soul received it from Mind, absolutely unchanged.*

Regarding the law of suggestion, psychologists of all time and especially our modern psychologists, have been at great variance; and this for the reason that nothing arising to the dignity of the Science of Psychology had been evolved or formulated until very recently. The first printed formulation of the Science of Psychology was—"The Law of Psychic Phenomena," that Thompson J. Hudson published to the world in 1893.

Hudson and other psychologists, who wrote in his day, and since, have made some very remarkable mistakes in their application of the law of suggestion, to which I desire at this time to call attention.

Hudson and the others have announced that the Soul—to which they have referred as the subjective mind, the subconscious mind, the subliminal mind, etc., is *always amenable to control by suggestion.*

That is absolutely not true. If the Soul was always amenable to control by suggestion, Mind would not be the sentinel at the gate; would not be the censor to prevent the entrance to the Soul of that which it should not permit. To proclaim the constant amenability of the Soul to suggestion, would be to say that the avenue of transmission of intelligence from this environmental existence to the Soul is always wide open—unguarded; which the experience of each individual demonstrates is not true.

The Soul is amenable to control by suggestion:

First—When the brain is functioning with sufficient normality to transmit vibrations—from the physical environment to the Soul—in such manner that they are or may *be evolved into Mind as conscious memory.*

Second—The Mind of a person being able to receive impression and transmit intelligence, the Soul is *amenable to control by suggestion*, unless that Mind refuses to receive or transmit what is presented.

Third—The Soul is amenable to control by suggestion, from the extraneous environment through the medium of common and special sensation; and from the tissue elements or the cells of the organism, in what, for want of a better term, we

shall call—tissue sense—which is the medium through which the Soul is constantly informed as to the condition of each animate atom of the body while the brain and nerve system is sufficiently normal to be in communication with the seat of sensation; without which information the Soul would be unadvised as to the health of the person and would not know when it must withdraw from the clay, in the act we call dissolution.

So we must remember, at this juncture, that the Soul is not laid bare to this world. The Soul has at its threshold the human organism, which through Mind; through common and special sense; and through tissue sense, protects the Soul, so long as the material remains animate, and through these avenues advises the Soul of the body's adverse anatomic relation and chemical consistence. *When adverse conditions render these agencies no longer able to protect the Soul, it withdraws from the influence of the physical environment, by the process called dissolution—death.*

In a specific sense, there are two ways of giving suggestion:

First—To one that knows, suggestion is being given and is willing to receive it. This includes suggestion from the organism, such as I have spoken about in relation to the physical environment, such as cold, heat, etc., but especially, to specific intelligence conveyed by means of written and spoken words, gestures, signs, tokens, etc. This phase of suggestion may be given positively, affirmatively, and in the form of direction or command.

Second—Suggestion to an individual without his knowledge and consent, which may be the conveyance of specific information from his organism, through the medium of sensation of all kinds, or by written and spoken words, gestures, signs, tokens, etc.

In the science of Psychology we deal particularly with these two phases of suggestion.

In the department of Psychology called Hypnotism, the subject must always know that he is receiving and be willing to receive the suggestion, and the *suggestion must be given in the form of a direction or command.*

In the department of Psychology called Telepathy, the subject must not know that the suggestion is being given, and *the suggestion must always be given in the first person singular*, " I," as though the individual himself spoke.

To illustrate the mode of suggestion in Telepathy: I was once in Washington, D. C., and found myself with barely enough money to pay my hotel bill, and with less than enough to get from there to New York, where I was going. I made up my mind that I would cash a check at a bank on Pennsylvania Avenue

I did not know a banker there, and I did not know an individual in Washington. I sat down and waited until the impulse came to go in a certain direction; then went down the street in that direction; presently I felt impelled to go into a certain bank—I had been a banker, knew the rules of banking, and knew what a ridiculous thing it would be for a stranger to ask that a personal check be cashed without identification and endorsement.

I had a small draft to have cashed. I took the draft out, approached the cashier, introduced myself to him, endorsed the draft and laid it down, telling him that I wanted it cashed. That much I did with his knowledge and consent. He picked up the draft, smiled, and as he was smiling and reading the draft, I was holding over him, on him and in him this thought: " Well, this draft is all right, I will cash it."

" Well," is a term of compromise, and if you have ever noticed, at the end of a discussion or contention the one convinced, or yielding, will nearly always say: " Well, all right then,"—finishing with terms of acquiescence. So I held this thought as and for the cashier—" Well, this draft is all right, I will cash it." Pretty soon he looked up and said: " Well, this draft is all right, I will cash it; but, of course, you know that it is unusual." So he wrote his O. K. across the back of the draft.

Then I said to the Cashier: " I will need some more money. I wish to have a personal check for so many dollars, (naming the amount), cashed." Then without waiting for him to reply, I walked across the lobby, presented the draft at the

window, got the money, came back, and he said: "Why, Doctor, this is absolutely unheard of." I replied that I knew it was, but that the emergency was great, and then I went on and explained to him who I was, where I was from, and the nature of my embarrassment.

And right here I desire to call your attention to one important thing: unless you are absolutely honest in the transaction, you cannot succeed. Then I walked over to the center of the lobby to a desk, counted my money and remained engaged for some time. While standing there I was holding this thought over, on and in the cashier: "Well, he is all right, I will cash his check." I had become so passively concentrated as to have lost for the time all consciousness but that thought. I do not know how long I stood there. Finally, some one said: "Doctor!" I looked around and saw the cashier standing near me; he had come out into the lobby. Touching my arm, he said: "Excuse me!—Well, you are all right, I 'll cash your check." He put his endorsement on the back of my check and I went over to the window and got the money ☙

Notice the importance of the transaction and the form of language used in the suggestion: the first person, singular, as though he were speaking; not as though I spoke, but as though he spoke; as though he was making up his Mind to do what I wanted him to do; as though he was quieting his fears and infusing confidence into his Mind that the transaction was all right. Remember that I never allowed him to reach the conclusion that it was not all right. It is hard to remove such a conclusion, although groundless.

So much for the two phases of suggestion. We now come to a consideration of the modus operandi, or plan of giving specific suggestion ☙ ☙

First—Secure conditions in yourself and to accomplish this rid yourself of all that is selfish, unworthy and untrue. Then proceed to obtain, step by step, the following conditions ☙

Second—Have the individual come to you. If you cannot have him to come to you, then have him do something at your request. For instance, you go into the place of business of an individual to whom you wish to give a specific suggestion,

and after you have talked with him a while, as he sits in his office, if you wish to succeed, you must manage, before you come to the point of offering the important suggestion, to have him do something for you at your request, if it is no more than to walk across the floor and hand you a chair, or do you some little courtesy—it makes no difference what—*so long as at your request he does something for you.* Then, having secured his proper attitude, give him the suggestion. ¶ As to those that are contemplating a doctor's career, I desire to say in this connection, that you will find it very frequently necessary in your work, to use this plan. For instance, an individual is lying in bed, and has the attitude that he cannot get up. You are going to have him get out of bed. You are going to put him on your table for the purpose of attending to the needs of his body. His concept of it is that he cannot get up. Therefore, you must get him to do something for you before you give the final suggestion to him to get up. It is quite immaterial what he does if it is nothing more than at your suggestion to turn his head, raise his arm and extend it, put his foot down, draw it up, or some incidental thing like that. *When he has performed at your request one thing that he thought he could not do*, he is ready for you to proceed with the suggestion that he arise, and it will surprise you how quickly the individual will grasp the thought that he is able to do so, and will come to the proper attitude to accept any suggestion, within reason that you may desire to offer.

THIRD—*You should obtain absolute confidence on the part of yourself* and the *subject.* Never undertake to give a specific suggestion until you have established in your mind absolute confidence in yourself as to that thing. You will understand that this is incidental often to relieving yourself of anything that is untoward and improper.

Let me bring your attention to this fact, especially the young people. If you will observe this statement carefully, you will never get the " mitten." Before you " pop " the all-important question, if you will wait until you have established absolute confidence in the dear one's mind and yours, you will never

be disappointed. Never ask an important question of that kind without proper thought and preparation. It is always unadvisable ∞ ∞

FOURTH—The next step is even more important. You must not only become absolutely confident, but you must see that the other individual become *absolutely passive.* Absolute passivity is, for the moment to cease to think. *Willingness* is often confused with *passivity. Willingness always precedes passivity which could not be attained if it did not prepare the way* ∞ ∞

This matter of passivity is a very important one to the human family, and one very difficult to attain. The Yoga or Hindu fakir spends the half or more of his lifetime in teaching himself to be absolutely passive under any circumstance.

If you would be passive, you must *cease to expend mental effort.* That is, you must cease to offer to control your mind or your body in any of its parts. You must be as one utterly without power.

Professor Edward B. Warman tells a story to illustrate this, of which I am very fond. He says that on the New England coast there is a lighthouse many miles from the mainland, on a little rocky island, absolutely without vegetation. There is nothing on that island but the lighthouse. The keeper lives there all alone, his only diversion is to move around the lighthouse as the sun seems to move, keeping in the shade ∞ Some visitors went to the lighthouse once upon a day and found the old man sitting in his chair in the shade. They said to him: " My good sir, how can you live here all alone, for years at a time, only occasionally seeing a human being; what in the world do you do to pass the time? " " Well," the old man said, " I will tell you, my friends, what I do. I just ' set ' and think, and then sometimes I just ' set.' " *The old man had learned passivity.*

Passivity is necessary to relaxation, and this fact is applicable to the work of Chiropractors. It is also applicable to the maintenance of health under all circumstances. Willingness will not suffice. Willingness must precede and passivity follow, if relaxation is to be attained.

FIFTH—With passivity, you must secure, at the right time, *concentration;* not that concentration that requires affirmativeness, but that form of concentration that is more peculiarly illustrated in prayer. There is something you desire, but are willing that it shall or shall not be given you. That kind of concentration must be produced in the individual to whom you would give a suggestion. This form of concentrated passivity is beautifully illustrated in the prayer of Jesus Christ upon the Cross.

SIXTH—Before you accomplish these, as a prefatory step in many instances you will have to unload your individual. That is to say, you meet a man on the street to whom you desire to talk. He is angry with you. You must hold your temper and let him unload. You must let him fume, and fret and snort, and call you a " scamp " if he desires. Let him go right on until he is done. Do not " badger " him, for if you do he will never get unloaded; because when you " badger " you are only loading him up again. You must wait in that passivity that the old man illustrated when " he just set," and let him wear himself out. This requires the most profound control, but it can be done, and one that would properly apply suggestion must learn to exercise such control.

When the man is unloaded, he will cease to be positive, active, aggressive, and will immediately become passive and negative. He has emptied himself, as it were, and is now ready for you to fill, and you should lose no time in commencing. Instantly he comes to that attitude, you assume the positive attitude, concentrate actively, and proceed to fill him up with the suggestion that you have been waiting to give; and as he assumes a more profound negative you may become more positive.

I shall never forget an illustration of this that occurred when I was practising law in Northwestern Iowa. Incidentally I was also guilty of conducting a newspaper. I shall not tell you the politics because that is none of your business. Although it was a newspaper, it contained birth, death and marriage notices.

I had written up a wedding. A young man about forty-eight

years old had married a bachelor girl reasonably close to his age—a good match, and perfectly satisfactory to me and to them ❧ ❧

The families were quite wealthy, on both sides, and I had done the best I could in the matter of write-up. You know newspapers are never paid anything for wedding, birth and death notices, although they are the most important events that occur. Newspapers are only paid for advertisements of those unimportant things that nobody cares enough about to read, unless they are so peculiarly worded as to make the public notice them.

I had learned that the most valuable wedding present was a twenty dollar gold piece. The young man was mad because I had said: "None of the presents were especially rich, but all were very nice and appropriate." So the next day, but one, he came to my office. When he came he intended to lick me, but he looked me over carefully and I saw that he was rapidly changing his mind. He seemed to read something in my attitude that made him hesitate on that branch of the subject, but he was loaded to the guards with indignation.

I sat at my desk, with my legs crossed—and that is a thing that should be remembered; cross your feet and your hands—lock yourself in, as it were. He just fumed and cavorted and ripped and tore. I let him go, just let him sail on. Finally he began to get short of breath, physically and mentally. When he first came in he told me he would take his name off the subscription list—and I do not know what all, but finally he came out of that attitude and sat down to talk. He talked and talked, but I did not say a word.

Finally the man became almost silent. Then I commenced to look at him and to hold this thought over, on and in him: "Well, I have made an awful fool of myself." "I have made an awful fool of myself." In about half a minute he became entirely silent. Then I opened up on him. I shall not undertake to tell you what I said, but I told him enough, all in the most kindly way, too, trying to make him see himself. I revealed the grovelling side of his nature to him, talked to him as I know no other human being had ever talked to him.

He took it as passively as a little child, and finally took up the conversation, turned it to other things, congratulated me upon my editorship of the paper, and before he left paid the cash for a year's subscription in advance.

SEVENTH—In giving suggestion to an individual that does not know you are doing so, always use language of impulsion —not compulsion. Never say to an individual: " you must." The better method is to request something and accompany the request with the silent suggestion of acquiescence, in the first person, singular, as though the individual answered as you wished.

I saved my life once by knowing these things and having them where I could control them. I was locked in a room with a man that declared he intended to kill me. He had a weapon in his hand. I was unarmed. Instantly I became passive and began to hold over and in him this thought: " Well, I would be a murderer. I would ruin my life. I would be destroyed." In less time than I can tell you the attitude of murder passed out of his mind, he became passive, apologized and we parted friends

EIGHTH—After having given a suggestion, always wait in the silence to clinch the thought; that is to give it time to become fixed in the Mind of the subject to whom you have given it

I could give you many illustrations of the value of these eight propositions; but time will not permit. However, I cannot resist giving you one, because it very completely illustrates the value of the eight propositions to which I have just addressed myself.

Shortly after President McKinley was assassinated, you will remember excitement ran high. I had the misfortune to be the chairman of the Democratic Central Committee of the county in which I practised law in Iowa.

During my administration the county, usually Republican by fifteen hundred, became Democratic, in the campaign that closed immediately before the assassination took place. I was, therefore, the object of a great deal of political hatred.

¶ Through one of the henchmen of the opposite party, the report was circulated about the court house one morning,

that I had said that I would defend the murderer of McKinley; six or eight men, somewhat under the influence of liquor, stopped me on the court house steps and began cursing me. A crowd began to gather and in a moment I was surrounded by more than three hundred angry, desperate men, insisting upon taking my life.

You may imagine something of the sensation of such a situation, but you cannot fully understand unless you have been thus placed. If you have never heard the roar of an angry mob, pray earnestly that you may never be compelled to hear it; especially if the attention of that mob is directed toward you.

I at once stood still and became absolutely passive. I remembered to fold my arms and bow my head, the attitude of passivity. Remember that attitude is in itself a silent, impulsive suggestion.

I looked the men near me steadfastly in the eye. They kept coming closer and closer, being forced on by those behind. I held the thought for them that no man in the front rank of the oncoming mob would touch me. I held the thought this way: " I will not strike." " I will not strike."

The open space about me kept constantly getting less; those in the front rank holding the crowd back. I held them thus for some time and no one struck me. Eventually, if assistance had not arrived, they would have overcome me; because those behind were not influenced by my thought; and they were pushing on the front ranks in spite of themselves; and finally would have pushed them against me, and physical contact would have broken passivity and precipitated my death ☙ ☙

Note one peculiar fact proving the influence of the suggestion. Those in the front were resisting with every bit of power they had and were trying to stand back from me, while those behind were crowding forward.

The County Attorney, a Republican leader, came from within the court house and saw what was taking place. He laid off his coat, not saying a word, folded his arms and marched directly down through the center of that crowd

toward me, entered the ring and stood beside me. On seeing him the men instantly came to their senses and began to back away. In less than a half minute there was no one present but the County Attorney and myself. You may understand that I thanked him with a good deal of pleasure and warmth.

Thus again the wonderful power of suggestion, saved my life. I shall not multiply illustrations. I only call it to your attention in this way that you may see the value of acquiring this power; that you may understand what an immaculate thing the power of suggestion is; that you may understand its practical use and value. It is the most ready, constant and valuable power within the capacity of human beings.

In the further discussion of the Science of Psychology, I shall have many illustrations of the practical application, and the wonderful power of suggestion.

May you learn to correctly use it, and may its use become one of the most valuable agents in your life.

LECTURE NO. 4.
JUNE 16, 1913.

Language of the Soul—Telepathy

MY FRIENDS: Before pursuing the thought in connection with things respecting the Soul of a human being and that phase of it considered under the title, "Telepathy," I desire to say by way of

RECAPITULATION

that we found that suggestion is the commonest of our experiences, and is the transmission of intelligence from the physical being, *First*, from the cells of the body of the individual to his Soul, and *second*, from the Mind of the individual to his Soul in what we know as auto-suggestion.

We found that by auto-suggestion we build memory, mind, will, and all of the various qualities that give us strength and definiteness in this physical existence.

We found also, that by auto-suggestion we build health, strength; secure proper mental attitude; the power to grasp the situation, and to cope with those things that stand in the way, as opposed to our advancement in this life.

We found that by, and through, the means of suggestion we obtain information from the extra-environment—that is, from the earth relationship of the human being and transmit that:

FIRST—Through the five senses, classified as common apprehension, or feeling, and by seeing, hearing, tasting and smelling, which are classified as special senses, but which, after all, when we give them second thought, are nothing but common sensation.

SECOND—We found that aside from these, there is the conveyance of intelligence through the Mind of the individual,

to his Soul, and at the same time the conveyance of information to the Souls of others by and through the medium of the Minds of others, by the common means of transmission of thought in what we call signs, tokens, pictures, written and printed language, etc.

THIRD—We found that our immediate means for transmission of intelligence by the power of suggestion is by spoken language, and that in this particular, man is the only animal that has this specific power of transmission of intelligence.

We observed that in all these methods the thing that is paramount and seemingly of greatest importance, is the fact that all of these methods are encumbered by the limitations of physical transmission of intelligence, by and through the medium of one sense, or the combination of two or more of our so-called special senses.

Therefore, these methods are the very most ordinary means of transmitting intelligence and do not, by any means, comprehend the phenomena of transmission of intelligence from one human being to another.

The steps indicated bring us to that congeries of phenomena relative to the transmission of intelligence, which is not accomplished by or through any of the senses, and is not limited to the physical scope of transmission of intelligence, which brings us to the subject for this lecture,

LANGUAGE OF THE SOUL—TELEPATHY

The word Telepathy signifies, "telling afar." The thought seems to have been impressed upon the Minds of those that formulated this word, that this means of communication is a telling afar; that there is not the nearness about it that there is about the transmission of intelligence by physical means ❧ It is a word coined for the purpose of distinguishing, in the thought of human beings, two phases of transmission of intelligence ❧ ❧

FIRST—That phase discussed under Suggestion, in which information is transmitted by and through the medium of the senses, and close at hand; and,

SECOND—That phase of transmission of Intelligence in which

distance makes no difference, and physical senses are not involved in the transmission.

I desire to call your attention to the fact that *telepathy is nothing more nor less than a differentiated suggestion*, for you must understand that, after all, the transmission of intelligence telepathically is not more than suggestion, with the difference that in telepathy we do not have the intervention of the physical limitations, while in suggestion, ordinarily considered, we always have the intervention of physical limitations ☙ ☙

One attribute of the Soul of man is potential omnipresence. The Soul has the potential quality of being present at any place at any time. When you stop to think about the value of this thought, you will understand that it is not wonderful, by any means, and will realize that when the Soul is unhampered by Mind, for the purpose of transmitting intelligence, it may be at any place that is desired.

The *Soul is incapable of desire*. It will, however, carry out any command of Mind as far as possible, and for that purpose, the Soul when freed from the burden of Mind which necessarily means weakness of flesh, has the capacity to be instantly at the place directed or commanded.

It is as though we could conceive ourselves mentally able to be present by an impulse of Mind where we saw fit. If we should think London—we are there. If we should think New York—we are there. If we should think the opposite side of the globe from where we are standing—instantly we are there. We instantly direct Mind to that point of the compass, but Mind does not go there. It only goes there in imagination ☙ ☙

The Soul, however, may be sufficiently at that place to take cognizance of universal truth, or deliver to a Soul, or Souls, the message it is given to bear at that time and place, no matter where it is. So, as a matter of fact, it makes no difference what the distance may be, if the transmission is without the intervention of physical sense, it is telepathy, whether the distance between Souls is one foot, one thousand miles, or any distance.

The striking feature of this fact comes to us when we think of the limitations of the Soul. Mind is limited in that it has no power to grasp the things of the Soul. It has no power to supervene material existence. It emanates from material, and is limited by material.

The Soul, on the other hand, is not material. It is immaterial. It is the medium or avenue through which Mind of the individual must communicate with the Great Soul, and must receive intelligence and energy from the Great Soul.

As striking as it may seem—*the Soul has no Mind.* From the physical side it can be and is slowly taught the language of Mind. Teaching the Soul the language of Mind is one of the most potent agents in the construction of memory.

You begin with the little child. You pick up a baby and begin to croon over it and talk to it, and it begins to respond in like sounds and words. What is taking place? You are teaching its Soul the language of Mind.

The language of Mind is being conveyed to the child's Soul, and is being radiated to the child's Mind and impressed there in what we call memory. This we may also classify as the translation of language into Soul understanding.

However, the difficulty is, that from the Soul side we have more to overcome. That is to say—we have less opportunity, for from the Great Soul side, our Soul is only impressed with universal truth. The Soul continually reflects that truth to Mind; but before Mind can grasp it, before it may be of any use to us, it must be translated into human intelligence; be made capable of expression in language.

The primary translation of universal truth into language is original thought, and can only be accomplished by the slow process of human experience.

However, much of the intelligence we receive from the Soul side, does not come to our Soul directly from the Great Soul, but from the Souls of others that have learned translated truth, through the remarkable medium of telepathy.

When we stop to think of it, all that a human being knows has reached and impressed itself upon his Mind telepathically ∞

All that we receive from the Soul side of being is called influx,

or impression, and much of it does not come to us in the form of language—*that is in words;* but comes to us as an entirety, in the form of tokens, symbols and pictures, the meaning of which must be ascertained and reduced to words before it is of any value to us. ¶ Definitely the human being must learn to translate the "still small voice" before he can know what is being impressed upon him.

This calls for the earnest, and life-long struggle of an individual if he would arise to the highest knowledge of which he is capable.

The individual that says, "I do not believe in the transmission of such intelligence," closes his mind to such impressions, and shuts off his opportunity to know; absolutely closes the fountain of universal knowledge which he could enjoy, by refusing to place himself in the mental attitude to receive ❧

As the result of disbelief, we have the most remarkable demonstration of resistance to universal truth. Even today, in our civilized, modern life, about which we brag, and upon which we vaunt ourselves so much, we are so materialistic that the majority resist this means of transmission of intelligence ❧ ❧

Such persons will tell you, when you speak to them about the possibilities of telepathy, that it is bosh, nonsense, foolishness, idiocy. When you ask them why they think so, they simply say because, they cannot understand how it can be accomplished ❧ ❧

My friends, any phenomenon tested in that way, would have to be disbelieved. We cannot understand how the grass grows, how the birds sing, how the ice melts on the snow capped peaks and the water trickles down the mountain side in rivulets and streams and finally in rivers to the sea. We cannot understand how the earth revolves upon its axis. We cannot understand the matchless movements of the heavenly bodies according to an absolute system and law. We understand no more of these than we do the more common and ordinary phenomena about us, which are a part of our every-day walk in life and which for that reason we have ceased to think about.

The most wonderful thing that occurs is the fact that food, after its various elaborations, is transmuted into animate flesh; is builded into a machine that clothes our Soul, and draws from the Soul knowledge and translates it into every day intelligence by means of which we are able to cope with our surroundings; which makes it possible for us to evolve mentally, and by great effort, in a lifetime, to think one or two, and sometimes perhaps several original thoughts ☙

Did you ever stop to think what an original thought is? It is the most immaculate thing that this life illustrates. The individual that has formulated one original thought must first have gone over all information upon that particular subject. *He must have reached the very end of all that had ever been thought upon that subject, and waiting in the attitude of that last thought, he must have heard the "still small voice" of universal truth, beyond anything heard before and must have translated a portion of it into human speech.*

We hear a great deal about original thinkers. We may consider ourselves fortunate if we have seen one. We have occasionally an independent thinker, we have very few original thinkers.

Those who would become original thinkers, may do so only by accepting this wonderful medium for the transmission of the substance of original truth—telepathy—substance that is constantly being telepathed to them, if they will only put themselves in the attitude to receive it.

It has always been a matter of greatest wonderment to me how any one could resist this intelligence, why any one should doubt the truth of telepathy, because it is the most common of all phenomena. It is a part of our everyday things. It is incident to every mental operation.

You can understand how the attitude of disbelief could have prevailed in the Dark Ages, and when I speak of the Dark Ages, I am not talking about a period a thousand or five hundred years ago. I am talking about a period two hundred years ago, when I would not have been permitted to stand before an audience even in this country and deliver this lecture, for before I could finish I would be in the hands of

the law, either as one insane, or as a dangerous citizen.

In times of such mental darkness and materialism it is not strange that there was little faith in that which, in the last few years, has been incorrectly classified as the occult. But in this day of general revelation, there is no such thing as justifying a disbelief in telepathy, it can only rest upon the basis of a willing ignorance.

A marked impulse to psychic development began something like one hundred and fifty years ago; progress, however, was very slow until the discovery of telegraphy.

Telegraphy brought to the minds of human beings forcibly the suggestion that there were other phases of transmission of intelligence, which had not yet been thought out and brought into use.

Then came the telephone and that still further widened the view and made the thought of other phases of transmission still more capable of practical consideration.

Then came the wonderful wireless telegraph, by which intelligence is transmitted without any machinery of transmission, within the ordinary meaning of that term, aside from the atmosphere.

Then belief in telepathy began to take hold of the people as never before, and especially in the last few years. I well remember, fifteen or twenty years ago, when the statement of belief in telepathy met with laughter and ridicule. Today no one that desires to be recognized as intelligent, will deny the fact of telepathy.

There are many that have not learned the method by which telepathy is accomplished, that have not practised it, that know nothing about its practical phases; but nevertheless understand that it is a common fact, not a subject for argument, and that to assert a disbelief in telepathy is to admit utter and absolute ignorance.

Because of lack of belief there has been much difference on this subject; but when we stop to think how common telepathy is, we are surprised that this should exist.

All have experienced telepathy in its ordinary phases. How usual it is to be sitting with a friend—you are both silent—

you are both passive—directly both begin talking about the same thing at the same time.

Again, you are walking with a friend and you are thinking of asking him a question; presently, without your having asked the question your friend begins answering it.

Many illustrations of the commonness of telepathy could be given, but time will not permit. It is sufficient for the occasion to discuss it in its practical phases.

Because of disbelief, the accomplishment of volitional telepathy is very difficult, because absolute faith is essential to anything in which the Soul is related.

You can understand that under favorable conditions the Soul constantly impresses information upon Mind; but just the moment we become careless about it—just the moment we do not wish the transmission of information—that moment the Soul withdraws, because it has no way of understanding. It is incapable of reasoning about what we want or need ❧. The Soul is incapable of reasoning about our attitude and therefore of course instantly we offer it an adverse suggestion, it acts upon it and withdraws and ceases to impress the truth that we would like to have evolved into our consciousness. Disbelief has rendered telepathy difficult indeed to attain; that is to say, well-defined, complete demonstrations of volitional telepathy.

However, I desire to say that if improvement goes on for the next fifty years as rapidly in this direction as it has in the immediate past in this country, telepathy will soon be a very common means for the transmission of intelligence. It will be as common at least as wireless telegraphy is now ❧ ❧

If you were in the Orient and were acquainted with the ways of the Hindus, you would find that telepathy is a very common means of communication with them now. They transmit intelligence of political upheavals, war, and other important news, telepathically instead of waiting for the slow medium of letter, courier, telegraph or any such means.

A Hindu specifically transmits telepathically to another Hindu at the place where the news is desired, the facts as

they take place and that Hindu makes it public and the people at that place instantly know the news.

But you say, " that is done in the Orient by people that have practised that sort of thing for thousands of years." When the dominant race that has evolved in the temperate zone of North America, shall turn its refined intellect, ingenuity and unconquerable determination earnestly to the development of telepathy, then that means of transmission of intelligence will advance with a rapidity that we are not now able to conceive ☙ ❧

We have by the present analysis two forms of telepathy. One, involitional and the other, volitional.

Involitional telepathy is the transmission *of intelligence without specific intention, without effort even on the part of the individual.* For instance, in the intelligence transmitted from a mother to a son in a far distant clime. Love tokens and messages are continually reaching him from her.

A person away from home finds the mental picture of wife, husband, sweetheart or other loved ones continually telepathed to him. He finds that he is continually receiving telepathically specific messages of love, affection, sickness, etc., from those at home.

You will also find the same character of telepathy from one individual to another in the same town—between individuals in the same house—between individuals in the same audience. Everywhere there is this common transmission of intelligence without intention.

The individual from whom the message goes is willing that the intelligence shall be transmitted, and because he is willing, and is *en rapport,* with the other individual the transmission is accomplished without intention or effort on his part, or on the part of the one that receives the message.

Volitional telepathy is the transmission of intelligence by specific intention. This has been classified by Psychologists under different names. In reading books on Psychology you will find volitional telepathy has been classified as mental telegraphy, mind transference, mind reading, thought transference, etc.

I desire here to emphasize the fact that it makes no difference how intelligence is transmitted, so long as the transmission occurs without the intervention of physical means, the transmission is telepathic, and when it is accomplished by specific intention, it is volitional telepathy.

Involitional telepathy, as I suggested, is the method most frequently used and is the method by which we have communications from those that are sick—those of our family that are away from home, etc. They are thinking of their loved ones with the desire that the knowledge of their situation shall be transmitted to them. They have no intention of sending a message to them but the attitude establishes rapport and the message is transmitted.

Individuals have in all times experienced this kind of transmission. The trouble has been that until recently people have paid no attention to this phase of transmission of intelligence. They called it dream, delusion, vision and resisted it. They have thought it was not practical, not reliable, nor important. Let me direct your attention to the fact that this means of transmission of intelligence is the most important, and often the most reliable which we possess.

The intelligence we receive by involitional telepathy constitutes the major portion of all that we know. Of course we have not understood this. We have never thought about it—have never analyzed it but the greatest fund of information that we have upon any subject has come to us, by involitional telepathy ☙ ☙

Without involitional telepathy we would be absolutely incapacitated to carry on our ordinary business affairs. Without it we would be absolute ignoramuses.

Today you are utterly incapable of stating where you got the greatest part of your information, but I desire to say to you that you got it through involitional telepathy.

As to volitional telepathy, or telepathy by specific intention, this is a valuable method for the transmission of intelligence secretly. By this means you do not have to tell in words, what you wish to convey.

There is much information that one desires to convey—

much that one desires to learn, that one cannot speak—that the very putting into speech would destroy the relation desired. For instance, you wish to learn the attitude of an individual toward you, whether he is friendly—whether he is opposed to you, or is willing to help you. You cannot go to him and say " are you my friend? " That would be obnoxious to him. Human perverseness is so great that after that he would likely not be your friend; or if you went to him and told him that you wished him to be your friend, or that you needed him for a friend, he would be repulsed. The relationship would be strained and the result would be unsatisfactory. ¶ But through the means of volitional telepathy you can ask the individual to help you—you can ask him to be your friend —you can ask him to bear with you—you can ask him for favors—you can suggest to him that he be your friend—that he will favor you. You can encompass him in all the multifold ways that make up the relationship of our everyday life—you can inquire into the attitude of his mind upon certain subjects—you can receive the answers to these inquiries as clearly and as absolutely as if he told you, and yet he will not know that you are communicating with him at all.

Suppose the help of an individual is desired. I have used this method many times in legislative campaigns. I wanted the help of a particular man. I could not go and ask him to help me because that would be indelicate as well as dangerous, but I have gone and sat in his presence and talked to him about the subject that I wanted his mind to dwell upon—discussed it in a general and abstract way and while doing so held this thought over, on and in him—" this is a worthy thing I will help it." And many times on starting to leave him the man has taken my hand and said—" Well that proposition is a worthy one I will help you with it." He had received the message from me by means of volitional telepathy, but did not know it and just supposed that it had evolved it in his own mind.

You can see the difference in ultimate value between securing a certain attitude on the part of an individual telepathically, and securing that attitude by asking in words. The difference

is that by telepathy he arrives at the attitude that he will help, because it is a worthy proposition. You have in such a one a friend that will stay by that proposition because he thinks he thought of it himself. He does not know you had anything to do with it. He thinks he is so big, noble and magnanimous that he thought of it himself, therefore, his mind is inalterably fixed in that attitude. Whereas if you had asked him in words and he had agreed to the same attitude, there would have been that half-heartedness of following the plan of another, and not the enthusiasm of an originator ☙

¶ Again to you as students, telepathy is one of the best means of diagnosis that you can acquire. You will remember that the Soul is constantly receiving information from the tissue elements or cells of the Body as to their condition. The individual that can learn to receive telepathic communication from his own Soul can know the physical condition of every cell in his Body that is in relation to nerves capable of transmitting vibrations to the brain.

The doctor that understands how to secure rapport can receive from the Soul of the individual that is sick, telepathic communication as to the exact condition of his Body, and can in that manner be advised as to what must be accomplished in order that the individual may get well.

I have made this statement in audiences where I was not known and have seen the smile of derision pass over the countenances of many individuals. Those that know me, know that telepathic diagnosis is practically demonstrated by me daily.

Those who have honestly tried diagnosis by means of telepathy have not been wholly disappointed, at least they need not have been, provided they devoted to the effort that degree of intelligence, care, patience, thought and loving determination necessary to acquire that proficiency.

The law of the Soul's relation to this material environment is to obey the commands of Mind. Mind is in charge. Mind is the sentinel at the gateway to the Soul for the purpose of determining what shall pass.

Therefore, if you desire to receive telepathic communication

—if you desire to receive psychic influx; if you desire to receive psychic impression, you must assume the attitude of desire to receive—you must continually hold yourself in an attitude to receive. That is to say, you must make yourself passive to communication.

Now, as to the *modus operandi* of telepathy—if you desire to send a telepathic communication, the first thing is to establish in Mind absolute faith that it is a possibility—not only that it is possible for another to accomplish; but—that you can accomplish it.

Now another thing is necessary in order that volitional telepathy shall be accomplished, and that is, that the individual to whom the message shall come shall be willing to receive it. He must not only be willing that messages shall be sent, but he must also be willing that messages shall be received, and in the willingness to receive telepathic communication lies the greater assurance of success.

People imagine that telepathy is a gift of certain individuals. That is not true, *it is a power incident to the intelligence department of all human beings. Successful telepathy depends more on the willingness to receive than anything else.*

In other words, if you are skeptical, if you do not believe in telepathy, if you declare that there is nothing in it, that it is abjectly ridiculous and foolish, you can never receive telepathic communication; because, by that mental attitude you have closed the door. You have shut the gateway between Mind and Soul on that subject, and while the Soul will continually receive telepathic impressions, it will not evolve them into your consciousness. And why? *Because it has received your disbelief as a command from Mind, and it obeys that command.*

Then, the other individual must have secured mental passivity, a willingness that the message shall be received, and that requires the same degree of faith on his part.

When you stop to think of these two propositions, you can understand why specific, volitional telepathic communication is so seldom accomplished. Think how difficult it would be to select, haphazard, an individual that has sufficient faith and

is ready to receive a telepathic communication. Also think how difficult it is for you to arise to that degree of faith that you can send a telepathic communication.

Many have said to me: " If you believe in telepathic communication, if you believe it can be done so easily, then why is it not more frequently accomplished? " My answer is that faith is minus. I am aware that *faith* is looked upon as being common, but let me call it to your attention that we are a *race of disbelievers*. We are particularly disbelievers of that which has not been made common to us by having been continually a part of our environment and relationship.

It has always been a matter of astonishment to me how far people will go out of their way to believe the impossible, and how they will resist belief in that which is common and is continually happening in their very presence, only they refuse, because of disbelief, to recognize that fact.

Therefore, faith must be the first thing. Skepticism renders telepathy absolutely impossible.

Then, there must be absolute honesty of purpose. No telepathy can be accomplished if it is to result in unfair advantage, either to yourself or another. It must be for a normal or, an honorable purpose, and unless it is, it will fail.

You must persist with faith until you succeed; until the communication has been accomplished, for failure to persist is proof that you lacked faith in the beginning.

Many persons imagine they have sufficient faith to send a telepathic communication. They try it once, twice, or perhaps, even three times, but do not succeed; then they say— " I just knew all the time that it could not be accomplished." ¶ That reminds me of the faith of the old woman that went out and prayed that the mountain in front of her door might be removed; prayed earnestly, expressing the thought that it was promised if one had faith equal to a grain of mustard seed they could remove mountains. The next morning, when she looked out of the door, she said—" There you are. Mr. Mountain just as I expected." It is evident that she did not have faith.

I do not know whether faith would have removed the moun-

tain, but I do know that the same lack of faith, will prevent the sending or receiving of a telepathic communication.

As to the message itself, first, secure conditions—that is to say, select the best time possible for sending the message. Select a time when the individual to whom you are going to send the message is least likely to be mentally employed; that is to say, least likely to be busy.

The best time ordinarily, to send the message is when the individual is about to fall asleep or at the time he is waking up. Of course, these conditions cannot always be known, but in so far as possible, you make success more sure by selecting the proper time to send the message.

I have received telepathic communications in the interim of court proceedings. I once received an involitional telepathic communication from my wife during such an interval. It was necessary for some incidental matters to be taken up by the court, and the trial I was engaged in was suspended for a few minutes. I stepped into the sheriff's office, sat down at a table and laid my head on my arms, a position I assumed a great deal at that time for resting. Instantly I relaxed and became passive, I heard the voice of my wife, just as if she had stood by my side, say—" Willard come home, I am sick." I not only heard her voice pronounce the words, but I saw her lying upon a surgeon's table. I stepped out into the court room and told the lawyer that was in the case with me that he would have to finish the trial as I had to go home; that I had received a message that my wife was sick. He looked at me in utter astonishment and said he had not seen a messenger boy. I told him I had received the message all the same. I took the next train home, and when I arrived in town, I at once telephoned my house and asked how my wife was. The neighbor woman that answered the telephone wanted to know how I knew my wife was sick, and asked if she had telegraphed. I told her that she had not telegraphed me, but that she had sent a message just the same. I had not only received the message in words but had received it in a picture, for at the time I received it she was lying on a surgeon's table in an office adjoining mine.

Now if I had not been passive, if the trial of the case had not been stopped at just that particular time, I might never have received that telepathic communication. That is to say, I might never have known it. It would have reached my Soul, of course, but it might never have been evolved above the threshold of my consciousness, and for that reason I would not have known of its receipt. Had I been busy, had I been engrossed in the trial of the case, I should not have been in condition to have received the message, although possibly at the end of the trial it might have evolved into consciousness, but that is not by any means certain.

So you see how easily a telepathic communication may go astray; how easily it may reach the Soul of the individual, but never reach the *consciousness* of the individual.

Prepare your message with the same scrupulous care that you would use in the preparation of a message that would cost two dollars a word. Be just as chary of words as possible. Write the message again and again until you have reduced it to the fewest words that will convey the thought.

Then a good method for beginners is to place the message against the forehead. There is nothing in that except that it brings the individual in touch, as it were, and aids in concentration; then, hold the thought of the message not in words, but as an entirety. Impress it upon the Soul with the prayer-like desire that it shall be conveyed to the individual it was designed for, and shall be evolved into his consciousness. Hold the message on him, over him and in him, coupled with the desire for evolvement, until you feel that the message has been delivered.

I cannot describe the sensation of delivery of the message. I can only attempt to make it understood by illustration. No doubt, you have often been in mental competition with an individual—for instance, you are trying to prevent a quarrel and find yourself talking with an individual, trying to dissuade him from doing some particular thing and while his last statement is a declaration of his determination to do that thing, still you feel a sense of rest and victory, you feel that he is not going to do it, but is going to do what you are trying

to persuade him to do. ¶ It is just that same sense of having accomplished—of having succeeded, that you are to wait for, in the silence, when you are sending a message, and the period of thus waiting may be a moment or it may be many minutes or hours. *Do not strive for the sensation of victory. Do not affirmatively try to reach it, but just hold the thought of the message with care, concentration and passivity until you feel that sense of relaxation and success pass over you and then you may be sure that the message has been delivered.*

You may not be able to tell that it has been immediately evolved into the consciousness of the one to whom sent. However, you will not feel the sense of rest in its completeness until it has been evolved above the threshold of consciousness, or until preparation has been made for it to be evolved ☙ Many times it is not evolved at once, but is so impressed that it will be the first thought of the person when he awakes, if he is sleeping or when he quits doing what is absorbing his attention at the time and becomes passive. In either case you will have the same sensation of success as though it had been immediately accomplished.

Now my friends, I would like to illustrate the success of telepathy to you by many examples that I have known, or that have occurred in my life but time does not permit. However, I desire to say this in passing, I have demonstrated specific telepathy in many instances, and I will not refrain from giving you one of them.

At one time a man owed me, on a judgment, two hundred dollars. He was " execution proof." I made up my Mind that I would collect that money by telepathy.

So one night I went to my office, turned on the light, sat down at the desk and wrote him a long letter, covering the subject in all its details, showing him why he should pay this debt for his own welfare, arguing all the proposition kindly and patiently. Then I folded the letter and enclosed it in an envelope, which I addressed to him. Then I wrote a message just as if I were going to transmit it by telegraph. He was a railroad man and I knew when his train would reach his town, and that it was his habit to retire as soon as he got in.

So shortly after the time of his train arrival, I took the letter and message in my hand, turned off the light and holding the message to my forehead sent these words: " Well, I will pay you the two hundred dollars." I held the message over him, on him and in him, every moment I had opportunity for three days and nights, except when I was asleep.

However, almost at once I felt the sensation of relief about it that I have endeavored to describe as following successful delivery of a message; *but I continued to hold the thought to insure against later adverse suggestion.*

On the fourth morning after sending, I received a letter from him and the very first thing stated in it was: " Well, I will pay you the two hundred dollars. Meet me at such and such a place and I will pay the money." I went to that place at the time stated, did just what I said I would do and that is an important point, to have failed to keep the appointment by a minute would probably have been fatal to the experiment, for it is more than probable that, responding to the suggestion, he had promised himself to be there with the money at the appointed time and if I had not arrived it would have acted upon him as an adverse counter-suggestion, which coupled with his interest would have overcome the suggestion of the telepathic message.

However, when I kept the date, it added to the force of the suggestion, and he proceeded to do what he had said he would do, although his lawyer was there trying to dissuade him from paying the debt, insisting that the payment was unnecessary, could not be enforced, etc., but the telepathic communication had done its work on him. His concept of the situation was that he had thought it all out and had made up his mind to do the honorable thing and pay me, and nobody could have persuaded him to turn aside from that intention.

¶ This only illustrates the practicability of telepathy and what may be done by those that will be *sufficiently persistent and patient.* The great difficulty about it is that it requires *time, effort and persistence far in excess of that which the ordinary individual will bring to a task.*

I shall not further illustrate at this time. However, in closing,

I desire to call your attention to one very important thing. In telepathy Mind stands as sentinel to the Soul. It is the master of the situation; it permits to evolve from the Soul, to our consciousness only what it is willing to receive; it impresses on the Soul only what it is willing shall be impressed; it permits to escape from the Soul telepathically only what it is willing shall escape.

In other words the law governing telepathy is such, that we can at all times maintain our absolute, distinct and inviolable individuality. No other human being, can by any means, change us, or take advantage of us. We are given the power of a free agent. We can do or think what we desire and the fact cannot escape us by means of telepathy against our will. ¶ An individual that is not willing that one shall receive a telepathic communication from him upon a specific subject has only to close that avenue. He has only to say to his Soul: "*Do not transmit information on this subject to anybody; This must be kept secret*," and the Soul will absolutely obey the command

It may be asked: "If telepathy can be accomplished so easily as you say, then why do not people take advantage of each other in business transactions by use of it? Why is it that a person apt in telepathy, does not by that means inquire into business secrets, and having acquired a knowledge of them take advantage with respect to them?" The answer is that it is absolutely impossible to receive telepathic communication from an individual upon a subject about which he has instructed his Soul, that there shall be no communication

People have erroneously supposed that they could follow a murderer; a criminal, telepathically. They have supposed that they could actually follow and read telepathically from that individual upon the subject of his criminal acts or other wrongful conduct.

The wonderful tragedy: "The Bells" in which Henry Irving made his great success was based, as you will recall, upon the erroneous hypothesis that an individual in complete hypnotic sleep may be made to reveal the fact that he is a murderer.

Such things are absolutely impossible. ¶ No human being ever communicated telepathically, any fact or circumstance which he had instructed his Soul should not be transmitted. *To say otherwise, is but to announce that man is not possessed of an individuality and a free and independent agency.*

Now, let us remember the importance of this lesson. If we desire to receive the highest form of intelligence, to wit: the intelligence from the Soul side of existence, we must always keep ourselves in an attitude to receive. We must believe in the influx of universal intelligence, and must continually keep our Minds open for that transmission.

Then, if we desire to receive from the physical environment around us the highest form of telepathic suggestion, the transmission of the most valuable thought, we must make ourselves passive, at all times, to the reception of telepathic communications.

If we desire to bring our bodies to the highest development possible, we must learn to understand, that our Souls are the bases of transmission of knowledge, as to every condition, and that if we continually keep ourselves in the attitude to receive that form of intelligence, we can know our physical existence, our physical condition from day to day.

If we desire friends; if we desire that no human being shall have ill will toward us, we can continually control these conditions by telepathic radiations of friendship, good cheer, good wishes, love and strength. May you come into a realization of these truths.

LECTURE NO. 5.
JUNE 17, 1913.

Suggestion Applied—Hypnotism

MY FRIENDS: From the lectures on suggestion and telepathy, I wish to state by way of

RECAPITULATION

we learned that beyond the limitations of the physical we are still able to carry out the laws of suggestion entirely divorced, in a particular and circumscribed sense, from the physical being, under what we call *telepathy*, which is the transmission of intelligence from Soul to Soul, through the medium of the Mind of the sender to the Mind of the receiver.

¶ The peculiar phase of this phenomenon, lies in the fact that there must be Mind at each end of the communication; but that with the *transmission*, Mind has nothing to do.

We found that in order to send a telepathic message one must have faith. He must also have concentration and persistence. In other words, he must persist with concentration until he has accomplished the desired result.

We learned that in order to receive a telepathic communication, one must have faith that he can receive such communication, and that he must then persistently wait in the attitude of receptivity.

We learned that through the medium of telepathy we build memory, mind, will, health, friendship and the power to love, and that through the influence of telepathy we attract or receive good will, friendship, help and love of others.

We found that telepathy, so far from being unusual, is the remarkable power that we continually rely upon and use, notwithstanding the fact that many, if questioned, would say that they do not believe in telepathy.

However, we found that the accomplishment of all these

things requires a concentrated passivity bordering upon sleep, and this thought brings us to a consideration of

HYPNOTISM

The word hypnotism is from the Greek word " hypnos," meaning sleep.

The word hypnotism was coined as a name for this phenomenon in the year 1843.

Most people suppose that hypnotism is old, and that its name is probably as aged as history, and it will astonish many to know, that its day is only since 1843, when it received its name from so common a thing as sleep.

From the standpoint of the individual, there are two methods of obtaining hypnosis:

One is by auto-suggestion, and is self produced sleep, induced by a suggestion directed to the Soul commanding it to put the Mind to sleep.

The other is from extraneous suggestion, that is suggestion coming to us through one or more of the senses addressed to the Soul in the same way, commanding the same result.

Hypnosis is nothing but sleep, but it is not induced in the same way that ordinary sleep is.

The difference between hypnosis and ordinary sleep is that ordinary sleep is induced without specific intention, while Hypnosis is induced by specific intention.

Most people do not understand that there is any intention to secure sleep at all. They just get ready at night and retire. They go to bed for the purpose of sleeping. They do not give themselves any specific suggestion of sleep. They only assume the attitude which they have habitually assumed for the purpose of sleeping. It makes no difference whether that is lying on the back, on the side or how, when ready to go to sleep they assume the attitude that they have formed the habit of assuming when they desire sleep, and they sleep as the result of the suggestion of position. There is general intention to sleep, but the sleep is not induced by specific intention

The individual has only become passive and has assumed the

ordinary attitude; the habitual attitude that suggests sleep. ¶ Hypnosis is sleep, acquired by specific intention, by a suggestion given for the express purpose of inducing sleep, and that suggestion may be offered by the individual himself, or it may be offered by another. However, it is no more than the result of the suggestion to sleep given specifically and with intention ☙ ☙

There are a great many erroneous concepts as to hypnotism. I do not know of any subject today about which there is such a wide diversity of thought; about which there are more strange, incongruous, ridiculous, adverse and foolish notions than about hypnotism.

The first erroneous conception that I desire to call to your attention is, that hypnosis can only be accomplished by an individual of strong will in an individual of weak will. You must understand that this is not true. *Per se hypnotism has absolutely nothing to do with what is ordinarily termed the will* ☙ Will is nothing but the result of mental habit. It is an *attitude-habit*, and in that relation stands no higher than anything you think, and *continue, habitually to think.*

The WILL is another of the bugaboos of this life.

Usually the individual that thinks he is possessed of great will power is greatly mistaken. He has mistaken consummate animal stubbornness for will power. *Any one can be stubborn, but it is quite a different thing to develop will power.*

Will consists in the ability to secure concentration, receptivity, passivity and continuity. This is not the general, but it is the true conception.

The general conception is, that the will stands out by itself and is in a peculiar sense an entity of Mind. It is not. *The will is a developed quality of Mind.*

One may develop the art of painting; may develop the art of music; may develop the power of analysis. In like manner one may develop the will.

The baby has no will. It begins instantly and continues to develop will, by forming mental habits, and thus it comes to be an individual of strong will, or an individual of weak will, as we say depending upon its surroundings, education,

habits, heredity and a multitude of things. In attempting to understand what will is, let us keep away from the thought of *stubborn, non-reasoning resistance.*

The essentials necessary to the building of what is ordinarily called will-power are—passivity to receive suggestion—concentration to fix upon the suggestion—and continuity in the suggestion or thought. *These qualities are essential to the induction of hypnosis.*

Another of the remarkable errors so common, in the minds of people is, that a hypnotist is some sort of a green-eyed monster; that he is possessed of some occult and mysterious power and that somehow, by the lightning flashes of his green eyes he is able to grasp and hold human beings; to bring them out of the environment in which they have lived, breathed and had their being and transform them into just what he would have them to be.

I have been in the homes of people in whom this erroneous idea was so strongly implanted that the subject of hypnotism and hypnotists would be mentioned with bated breath and with trembling lips, as though referring to or mentioning the name of some destroying monster.

I am glad to say that a great deal of this foolishness is passing and yet, the other day, at this institution, some of the students remarked to a woman that had been here, that I would deliver a lecture on hypnotism in a few days, and the woman said:—"Is Dr. Carver a hypnotist?" This in such tone and manner as to imply that, if he is, then he is surely the incarnation of the devil.

I desire to call your attention to the fact that there is nothing mysterious, nothing occult, nothing strange, nothing strained, nothing ridiculous about hypnotism. It is the simplest phenomenon that occurs, the very sweetest phenomenon that comes to our attention.

It is that phenomenon that we witness in the little babe when, for the first time it is laid to rest beside its mother. ¶ It is that phenomenon that kisses down the eyelids of childhood at the crooning of the mother's voice. It is that wondrous phenomenon that closes each day of toil in this

work-a-day world. ¶ It is the phenomenon that makes it possible for us to go on day after day exercising intelligence and power, and taking care of the duties and obligations of this life.

I desire that you come to realize that the sweetness of sleep is nothing but the demonstration of hypnosis.

We have sleep induced by suggestion from what we call anæsthetics. For those I cannot say so much, but for sleep at proper times, induced by specific intention, by passivity, too much, in favor, cannot be said.

It is supposed, as another erroneous concept, that one may be hypnotized against his fixed desire. It seems hardly necessary to add that such a thing is impossible.

I have been surprised at the remarks of people relative to this subject. It is a common occurrence for one to say: " I do not believe I could be hypnotized." Right, so long as the individual keeps that attitude he cannot be.

It requires a certain degree of intelligence on the part of an individual before he can be hypnotized, and one that " swells up " and makes that kind of a remark is usually short on that particular quality.

Any individual may be hypnotized, who has intelligence enough *provided he is willing*, and no one can be hypnotized under any circumstance *against his fixed desire*.

I say "*fixed desire*," because he may not be conscious of *desire* in the matter at all, one way or the other. Indeed, he may have no desire on the subject, and in that degree of passivity he may be hypnotized and he may imagine that he was hypnotized, without the question of desire entering into the matter.

However, the point is that no individual can be hypnotized against his *fixed* desire. In definite words, if one *does not wish to be hypnotized*, he *cannot be*. And that is why, it is difficult to find hypnotic subjects.

A person may think superficially, that he is perfectly willing to be hypnotized, but upon the test being made, find that more deeply impressed there is opposition—unwillingness. Such a person cannot be hypnotized.

A person may come to a hypnotist and request to be hypnotized, but when the test is made finds that he fails to respond to the suggestion because unconsciously he is unwilling, and in such an event, unless he can change his attitude, it is an utter impossibility to hypnotize him.

I can illustrate this to some of you that have been taking adjustings. The adjuster tells you to lie on the table and relax as though you were going to sleep. You say, all right, and you lie down and you superficially relax. That is, you think you relax, but when the operator tells you again to relax, you say you are relaxed. He says that you are not, and you say that you are doing your very best to relax. That is mentally—outsidely, but not insidely. You have not relaxed down through your body at all. You have only turned relaxation to the outside. You think you are willing to relax outside; but inside you find you are not willing to relax and cannot and the operator cannot adjust you, for in the fullest sense complete relaxation is necessary to complete adjusting

Now, if you have the same *kind of willingness to be hypnotized you cannot be, and for the very same reason.*

The reason you do not relax on the adjusting table is because *you have a suggestion of fear lodged in your Mind.* You have permitted yourself to say to your Soul: "I am afraid I shall be injured. I am afraid it will hurt," and the Soul is radiating that caution to your Mind all the time, and therefore, you cannot relax.

It is the same with an individual that has said to his Soul—"I am afraid to be hypnotized. Do not, I caution you—do not let me be hypnotized." Afterward he forgets that and says to a hypnotist—"Oh! yes, I am perfectly willing to be hypnotized." But the Soul has the caution he so carefully gave it and instantly the endeavor is made, it thrusts that caution into consciousness, rendering hypnosis impossible

One of my greatest disappointments is, that I cannot be hypnotized beyond the second stage. From childhood I have had a peculiar averseness to sleep. Therefore I can only be put into the second phase of hypnosis. My eyes can be closed

and I can be rendered motionless, but when the hypnotist attempts to go further and put my Mind to rest, instantly all his efforts are put aside and I am as wide awake and as much master of myself as it is possible to be. I have tried vainly to overcome this and I will succeed some day.

Now, all these stories about individuals that have been hypnotized, and taken away and destroyed are fabrications, pure and simple. There is not a word of truth in them, not one single solitary word. They are the imagery, the fantasy, the folk-lore, that is as wild and ridiculous as was that of witchcraft and the Inquisition.

There is another erroneous conception, that one, under hypnosis, can be made to divulge a secret.

When an individual has cautioned his Soul that a particular thing is not to be divulged under any circumstance, you may hypnotize him to the somnambulic state and he will never, by look, work or sign divulge any part of that secret. That thing is *utterly locked in his Soul* and it is not given over because *there stands that last command to the Soul.*

The Soul is without reason, and has not the power to displace the command or put aside the caution that has been given it, and instantly when the call comes for the forbidden fact, the command or caution comes from the Soul: " Do not divulge," and the *hypnosis is instantly at an end.*

Another erroneous conception still more remarkable is to the effect that, under hypnosis, one can be made to do what is against his fixed principle.

It is easy to understand why such an idea has obtained such a strong foothold. *It is impossible to tell, extraneously, what are one's fixed principles.*

I might hypnotize a person and induce him to do what would be contrary to what he *professed* when awake; but he might prove to be a hypocrite. It is utterly impossible to tell how many hypocrites are here this morning. It is just as impossible to tell how much of a hypocrite I am. We all have power to hide ourselves.

We are given the power to hide our fixed principles in order that we may be free agents. If we did not have it, we could

not be free agents. We could not exercise our individuality in relation with others. We would continually be the subject of obsession by our fellow-beings in all respects, and therefore, we are given the power to hide our fixed attitudes.

The error in conception is that one can be hypnotized and against his *fixed principle* be made to commit theft; to infract chastity; to commit murder, etc. To prove this, persons that in ordinary life exercise a *degree of honesty within the law* have been hypnotized and given the suggestion to steal, and they have stolen. Individuals that have a *reputation for chastity* have been given the suggestion, under hypnosis, to perform an act that would be unchaste, and they have performed such act. Individuals that have shown no *disposition to kill* have been given the suggestion, under hypnosis, that they commit murder and they have demonstrated *apparent willingness* to perform the act.

Those stated and almost innumerable other illustrations *prove that those individuals were, at bottom, thieves, unchaste and murderers;* that it was not against their *fixed principles* to commit such acts.

It has been demonstrated, under hypnosis, in many cases, that individuals that have been properly reared and educated, and at bottom are absolutely opposed to theft, and would rather die than take what belonged to another, have thrown off hypnosis and become normal upon it being suggested to them that they steal.

Individuals that have lived chaste lives and have demonstrated an absolute disposition to chastity have been hypnotized, and it has been suggested to them, under hypnosis, to commit an act of unchastity but instantly they have awakened and refused.

It has been suggested, under hypnosis, that an individual commit murder and he has been made to go through the form of murder to the very point of grasping a " tin " dagger, and rushing at the victim and striking at him as though he would stab him through the heart.

However, you must remember that there are two phases to that demonstration. The individual knew as well as anybody

that it was a " tin " dagger, and that it would not puncture the body. He also knew it was a play, and like all subjects under hypnosis, he played his part with exact fidelity. *But in case where the dagger was real the individual has awakened* and refused to act.

Do you know that any individual who is willing that the life of a fellow being shall be taken, is a murderer? I want you to understand that. If that thought could be sensed over this entire earth it would be the greatest civilizer the world has ever known. ANY INDIVIDUAL THAT, AT BOTTOM, IS WILLING, UNDER ANY CIRCUMSTANCE THAT THE LIFE OF A HUMAN BEING SHALL BE TAKEN, IS AT BOTTOM A MURDERER.

The foregoing statement includes nearly the whole human family. Therefore, is it strange that under hypnosis, murder may be suggested to an individual and the suggestion be accepted? Yet, if it is against *fixed principles to kill*, the subject cannot *under hypnosis be induced to kill.*

It is also supposed that the practice of hypnosis weakens the will. There is nothing so well adapted to the cultivation of strong will as to be hypnotized; not to be the operator, but to be the subject; for this reason: *that in order to be hypnotized one must acquire the habit of concentrated passivity held in continuity*, and there is no stronger exercise of will than is necessary to reach that attitude and maintain it.

It is also thought that hypnotism destroys Mind. I have already reverted to the fact that hypnosis strengthens mentality; that it prepares Mind for comprehensive suggestion. It trains Mind to continuity in passivity, the attitude necessary to receptivity and the establishment of profound memory ☙ ☙

Hypnosis increases the *capacity for deep impression and breadth of comprehension, essentials to the building of accurate memory and quick recollection.*

Of course, an individual could tamper with hypnosis until it became injurious. He could be hypnotized under circumstances that might render the result injurious. He could practise hypnosis so continuously as to become injurious. That is, an individual could form such a habit of allowing his

Mind to be put in abeyance as to weaken it. A person while under hypnosis is subject to any suggestion that does not contravene fixed principles and therefore is a *prey to the careless and unthoughtful.*

For the reason that one is subject to the suggestions of the thoughtless, one should always be very careful in the selection of an operator to hypnotize him; never selecting any but persons of *refined mind and habits* and of the *best intentions.* In other words, *every precaution should be taken against the possibility of adverse suggestion* and to *insure that only proper suggestion shall be given.* For reasons of this character, and others too many for enumeration, I wish to say that I am opposed to careless and indiscriminate demonstrations of hypnosis as an entertainment.

Demonstrations of hypnosis *should never be attempted except with the greatest seriousness and earnestness of purpose, and solely for the benefit of those involved.*

As to history, hypnotism has been known and used, under various circumstances and relationships of the human family, from the night of time. It is one of the common things that has always been known, but not as hypnotism. It was recognized as an incident to the human family and looked upon as a mystery.

We find many facts in history that can be explained upon no other hypothesis than that of hypnotism. I cannot go into the details of these; but must leave them to your research ☙

The first definite history we have of hypnotism was in 1776. In that year Franz Anton Mesmer, who lived in Paris, announced that he had found a way to put individuals into a peculiar and health-giving sleep.

Mesmer's idea was that the sleep was induced by magnetism. He secured the sleep by rubbing magnets over the body of the individual, at the same time suggesting to him orally that he become passive; that he sleep. He called it a magnetic sleep, and there are people to this day that think there is something magnetic or mesmeric incident to hypnotism ☙

I call your attention to the fact, my friends, that there is nothing magnetic about it. There is nothing mesmeric or

material about it. Magnetism is a power coming from the earth. *Hypnotism is a power emanating from the Soul, and has nothing to do with, and is not in any way related to magnetism.* ¶ Get the idea of magnetism everlastingly out of your Mind, because it will cause you a good deal of disquiet unless you understand it.

It is being taught that the body is a magnet, that the body exercises a peculiar magnetic influence upon others and there is a certain amount of truth about that; but you should be careful how far you go with that idea.

You must keep it in mind, that the *law governing magnetism applies to material only*, and in that sense applies to your body but hypnosis is accomplished by the *operation of psychic law.* ¶ The method of Mesmer in producing sleep was called in his honor, " Mesmerism." At about that time he began to treat the sick ☙ ☙

Up to that time, you will remember, there were no very definite ways of treating the sick. Surgery had not obtained its grasp on the people and the administration of decoctions, herbs, extracts of animals, and all of the most vile conglomerations that could be conceived, constituted the then practice of medicine.

People of all countries were crying out for something to relieve their physical infirmities, and therefore, the very moment that Mesmer secured the sleep, he began experimenting to see if he could not use it for the relief of disease ☙ He found that by the sleep he was able to remove many phases of abnormality, and he was especially successful with individuals that were excitable; with those subject to hysteria, nervousness and all such phases of abnormality.

When Mesmer made the announcement of success, the medical profession looked into the matter, *as they always do.* They appointed a commission to investigate. In fact, they actually appointed an honest committee. The committee investigated and reported that Mesmer was doing just what he claimed to do; was *actually curing* people and causing them to walk in newness of life.

When the august Medical Society of Paris received the com-

mittees's report it said, to the nether region with such a report. We will not accept it, for to accept such a report would be to admit that Mesmer has superseded us. *If a thought of this kind must come to the world, it must come through the proper channel. It must come through us.* Thoughts, as you know, may only come through channels characterized by sufficient intelligence to transmit them and this particular thought had sufficient reason for not coming through the medical channel.

The august members of the Medical Society of Paris said: Is it not likely, if there was any phenomenon of that kind, we would have discovered it long ago; we that look after the health of society at large? Is it likely that this ignoramus of a Mesmer should have discovered it? So they refused the report, and selected another committee.

The second committee was selected, like all committees of that kind are selected, because of the peculiar fitness of its members *NOT to investigate.* That committee did not investigate, but did ascertain that whatever it was that Mesmer was doing, *they could not learn to do.* So the committee reported that they could not discover Mesmer's secret and that it considered it unsafe to report his success to the public as You are aware that the medical profession has always been the guardian of the public. So the Society passed a resolution condemning Mesmer, charging that what he purported to do was *a fraud.*

The Society also said that Mesmer himself was a fraud and as a result, in 1815, Mesmer, a man of wealth, a man of education, a man of culture and refinement, had his estates taken from him. He was anathematized, ostracized and finally exiled from France.

When Mesmer was old, broken and decrepit, he was permitted to return to France. *It is with such kindness and consideration that the medical profession has always treated the world's health benefactors.*

About the time Mesmer came back to France, Dr. Braid of Manchester, England, made a wonderful discovery. Mesmer had said that the Mesmeric sleep was caused by a magnetic

fluid which, in some way, left the magnets and entered the body of the individual.

Now, according to medical science, if there is *fluid anywhere*—it is a medicine—it could be nothing else. Hot water is a medicine and so is cold water, so is ice and so is vibration, even though of a universal nature.

In view of this fact Dr. Braid reached the profound conclusion that there was no *magnetic fluid* and therefore, that there was no medicine and that the practice of Mesmerism was not the *practice of medicine*. The Medical Society of Manchester accepted his word and permitted him to practise it. Dr. Braid induced the sleep by having the individual sit down and look at a bright light, at the same time giving the suggestion of sleep. By this means he " got by " the medical profession, for they could find no particular objection to Dr. Braid's having a fellow sit down and look at a bright light while he told him to go to sleep, because the members of the medical profession practised that on themselves. You know they have a fashion of looking at something bright in a glass and then going to sleep.

About eighty years ago, in the United States of America, hypnotism began to be practised sporadically.

About forty-five years ago it was quite commonly practised over the country, to such an extent that school teachers in the common country schools lined their pupils up to test them to see how many were hypnotic subjects.

A great many teachers got into trouble about that, and many of them were discharged, because there were people in nearly every school district that were as wise as the medical doctors in Mesmer's time, and they knew that hypnotism was a fraud and not right and that hypnotists were in league with the devil. ¶ So the experimenting teacher would be given the " hay road " and would go out of the community with all the aspersions of an aroused and ignorant public cast upon him.

The *modus operandi* of inducing hypnotic sleep has had as many changes, almost, as the periods of time and the various forms of social advancement during its growth and development. I shall describe but a few of them.

As stated, Mesmer's plan was to stroke the body with magnets, at the same time giving the suggestion of sleep, not only in one way but in all ways he knew. He finally learned that to stroke the body with the bare hands, while giving the suggestion of sleep, was just as efficacious as stroking it with magnets.

Dr. Braid had the individual sit down in front of a bright light and gaze steadfastly at it, and in every way that he could, offered him the suggestion of sleep, giving the suggestion verbally in a loud commanding voice.

The plan of Dr. Bernheim was to begin by removing all fear of the sleep from the individual. He would begin by giving him the suggestion that he would be protected and cared for and no injury would come to him—nothing adverse would occur to him. Then he would offer the suggestion of sleep in its various steps. He would have the subject sit down, lean back, breathe deeply, close the eyes and thus take advantage of all those usual aids to the induction of sleep.

Dr. Warman's method is to have the individual sit down before him, place his knees in touch with those of the individual, take hold of the hands, place his thumbs over the ulnar nerve on the back of the hands and gaze fixedly into one eye, at the same time suggesting orally—rhythmic, diaphragmatic breathing. He suggests dilation of the pupil, following that with the suggestion of relaxation of the eyelids and at the proper time, by the suggestion of sleep.

It is quite immaterial which of these methods, or what method is adopted. The first thing that must be done is to secure the attention of the individual. Then the operator must have the subject understand what he is going to do and consent to it, and have the subject know what he is to do, and concentratedly enter upon its accomplishment.

If the subject has any fears, and he usually has, even though he does not know it, they must be removed. He must be induced to become passive and as he does so the operator must become positive. At this juncture the operator must suggest sleep. It is usually best to do so orally and while he is positive in continuity upon the suggestion of sleep, the

subject must be passive in continuity upon the thought of sleep ☙ ☙

The desire that the subject sleep must be mutual, continuous and unbroken, if success is to be attained. You will see, from this that hypnosis is a very simple matter indeed.

Years ago I had a considerable experience with the induction of hypnosis. Since I took up the profession of Chiropractic I have had no experience with it, on account of the unreasoning prejudice of the people. I knew that if they thought I was in any way connected with hypnotism they would not give me a chance to demonstrate Chiropractic.

Chiropractic was new. It had burdens enough and as I expected to stand in the forefront and do battle for it. I did not feel that I had the right to bring to it any further burdens than it already had. I thought that there were others that could fight the battles of Psychology and incidentally of hypnotism, so I ceased to make hypnotic demonstrations ☙ However, before taking the field for Chiropractic, I had induced hypnosis in many subjects. In the days when I practised law I was just as interested in Psychology as I am now. We had societies and clubs in which we carried on psychic study and demonstration and let me tell you, my friends, if there was no other reason in the world but the one I shall give you, I should love hypnotism and have confidence in it ☙ ☙

From a time when my mind does not run to the contrary, I was a slave to tobacco in every form, and I continued to use it to excess all through the years until I was thirty-three years of age. Then Dr. Burdette came to our town and organized a class in hypnotism. My friend, the editor of the daily paper, was there and was a member of the class. It happened that I knew nothing about it, and did not belong to the class. ¶ Dr. Burdette had explained that he could cure the drug habit by hypnosis. There were a number of medical doctors in the class, and of course, they could not believe that. They were just like the medical doctors of Paris and would not believe anything unless it came through the medical profession; unless they had instituted it themselves.

In the discussion Dr. Burdette said to them—" Do you know of any man that is addicted to the tobacco habit, that my curing would convince you? " My friend, the editor, had heard me say that I would like to be rid of the tobacco habit, so he suggested my name as a subject. The medical fellows said it would be all right if he cured me for they knew that they never saw me at night that I did not look like a locomotive, the smoke and fire flew to such an extent, and they never saw me in the daytime that I did not look like a double-header, with a chew of tobacco in each side of my mouth and puffing at a cigar. So they agreed that if the Doctor could cure me of the tobacco habit they would be convinced.

The next day my friend came to me and told me there was a hypnotist in town who would cure me of the tobacco habit if I would come down that night. I asked him what the expense would be, and he replied that there would be no charge; that I would be a clinic. I told him I would be on hand.

The Doctor put me in the second phase of hypnosis and suggested to me that there was a smell and taste about tobacco that I had never known before, and that the next time I smelled or tasted it, I would notice that smell and that taste and that these would be so strong as to be paramount to every other smell and taste, and that they would be so obnoxious, so repulsive and horrible as to cause revulsion. He gave me that suggestion in the most positive manner in every form that it was possible to express it, for a period of about five minutes.

All the time he was giving me those suggestions, I was sitting in the chair; could not move, nor open my eyes; yet, I knew everything he was saying, just as you, sitting here know what I am saying. When he released me, I looked up at him and said—" That was a beautiful speech you made, Prof. Burdette, but do you think I am going to be affected by that? " He said—" That is all right. All you have to do is to report tomorrow night." ¶ The next morning I started to my law office as usual. I had forgotten all about the transaction, which shows how frail is Mind; but *my Soul had the impression of the facts as they occurred.*

I pulled out a cigar and bit off the end. The taste was horrible. I looked at it, supposing that I had got the end of it into something and, not thinking of the events of the night before, I bit off a little more, spit it out and put the cigar in my mouth. It tasted just as bad as before.

Then I remembered what had occurred. I said to myself—Is it possible that I am such an idiot that I will let a little talk like that have so much influence on me. Why, the first thing I know I will let a jury look me in the face and stop me from arguing the case.

I held that cigar in my mouth all the way down to my office and I might as well have held a stick of quinine, the taste was so horrible. When I reached the office I threw the cigar into the "slobber-box,"—that is the proper name for it, and should be used instead of the dignified word—"cuspidor." ☙ I went to work. Directly I took out my pipe and tried that. It was worse than ever. My partner sat and smoked and looked at me. He had heard the whole story, and was greatly amused ☙ ☙

Finally I went home to luncheon. We had three meals a day then. We did not know any better. We did not live Chiropracticly ☙ ☙

After luncheon I thought I would go into the drug store and get a good cigar—so I bought a twenty-five cent one. I never committed that offence before. I bit the end off and put the cigar in my mouth. I shall never forget that cigar. It was a "Moose"—a "twenty-five cent 'Moose.'" It tasted just as nasty as the cigar I had that morning.

However, I took out a match and lighted it and before I got around the square I had let that cigar go out and relighted it several times. I smoked about one-third of it and threw the rest into the spittoon. I did not have the courage to try any more tobacco that day.

I went down to the class that night and made my report. You should have seen those medical doctors. Their astonishment can only be imagined—not described.

The doctor put me into the sleep again, gave me the same suggestions as the night before. He then gave the additional

suggestion that if I ever touched tobacco again it would make me deathly sick and that I would vomit till I nearly threw my boots up.

It had always been the greatest delight of my life to go into a tobacco store and look at the tobacco as it lay in the open caddies, or to gaze at the cigars in the open boxes. You know when an individual has a habit, *he loves everything that is a part of that habit, just as the insane love their insanity*. The tobacco habit with me was an insanity and I loved all of its sensations ☙ ☙

About three years later I went into a tobacco store to look at the caddies; I went to the back of the store to begin and believe me, I had a race with Jonah to get to the sidewalk ☙

Hypnotism is the most positive form of cultivation of the will, especially in children, and later I shall say more on that subject. It is the best method known for correcting bad mental habits, such as temper, fear, doubt, drug, tobacco and other habits.

I wish to talk to you for a moment about mental habits. Temper can be controlled and educated by hypnotism. The mother can sit down by the crib of her child, that has been showing evidences of temper, after it has gone to sleep, take hold of its hand, move it just enough to get the attention of the child, but not enough to wake it up and then tell it the beautiful story of control, of passivity, of continuity in passivity and thus build in that child's Mind the power to control the temper; to control the impulses that are adverse to the welfare of that child.

All individuals subject to that engine of destruction—fear can have it utterly and absolutely removed by means of hypnosis in conformity with the law of suggestion.

Also, as I have explained fully, there is no stronger aid to telepathic communication than hypnosis.

Hypnotism is the coming anæsthetic and will, at no distant day, be used for that purpose in all necessary surgery.

Now, my friends, let me beg of you that have fear of hypnotism, to lay aside ignorance, the mother of fear and be informed ☙ ☙

Learn that hypnotism presents the commonest phenomena with which you come in contact in life. Understand that it reaches back to the cradle—is incident to the cultivation of all worthy desires and qualities. Understand that it is necessary to health and strength. Then fearlessly and in proper attitude investigate it and you will never regret it. You will come to appreciate its wonderful efficacy and will use it as you use all other common powers, without any thought of its being mysterious or occult.

LECTURE NO. 6.
JUNE 18, 1913.

Rational Psychology

MY FRIENDS: In a sense these lectures have concluded. That is to say, the terminology has been given and explained and we now go to the more definite and specific parts of the work, that which is of value to us in the application of what has been said; and as to the phase of application that I wish to develop in this lecture let me

RECAPITULATE.

We have learned that the Mind is the physical or material agent of the Soul and that its scope and limitations are bounded by this life.

That the greater number of Mind attributes, such as reason, comparison, imagination, induction, memory, anger, jealousy, etc., are as transient as this existence is transient.

That Mind relations to the Soul are:

FIRST—to receive universal intelligence from the Soul;

SECOND—to transmit information from this environment to the Soul.

That the Soul has no reason, but always gives back to Mind, in the form of its impressions, that which is given it, the false as well as the true.

That Mind has that one remarkable attribute—deduction—sometimes called intuition—which is the potential power to instantly recognize universal law or truth.

That so far as we are concerned, Mind—our Mind—is the only intelligence; for we must take note of all phases of intelligence through the medium of Mind, as well as all other phenomena.

This brings us to the subject for consideration this morning:

Viewing this field as we have developed it, you will at once be impressed, especially following this recapitulation, with the wonderful importance to us of Mind, and while descanting upon it and impressing you with the wonderful importance of Mind, I am not attempting, either by direct inference, or by innuendo, to recall your appreciation from the remarkable and comprehensive value of the Soul. Indeed, I am not talking about the Soul. I am now addressing myself exclusively to Mind, and for that reason which must appeal to each one of us as being paramount, that Mind is the place where we begin all intelligence development.

Mind is not the avenue through which we commenced existence, by any means; but it is the avenue through which we begin intelligence development.

Our knowledge of individual existence dates back only, to the *beginning of our individual memory.*

You will see therefore, that it is of the utmost importance that we give more attention, more careful consideration to Mind and its attributes, than has heretofore been the habit of people in general.

There has always been a lack of earnest attention given to Mind. It has received from the human family a vast amount of neglect. It is entitled to a most profound consideration, and it is a plea for Mind that I bring to you especially.

As to Mind, the human family has, from the dawn of history, exercised two peculiar attitudes; one of them representing that vast number of humanity that fall within the scope of materialism ☙ ☙

I refer to those that cling tenaciously to this environmental, physical, seeable, hearable, tastable, smellable, touchable, handleable thing, we call our material world; those who believe that in some mysterious way which they do not find it possible to explain; life comes into existence and is maintained; that all forms of animation spring into existence because of certain relative phases that they have denominated kenetic energy.

These materialists talk of Mind, but talk of it as including the Soul. For in their explanation they refer all phenomena to the inter-relationship of material essence, and of course, their explanations are unsatisfactory, shortsighted and incapable of demonstration.

The other class referred to, that do not believe in material exclusively, take the other tangent, and as remarkable as it may seem talk almost continuously of the Soul, of psychic congeries of phenomena, disrelated from material things, as though matter really had no existence.

The teaching of this class therefore, is as full of error, as inexplicable, and as incapable of demonstration as is that of the abject materialist.

It would seem, without pausing to go into any analysis, that the truth is to be found somewhere between these antipodes; that the truth must lie in the golden mean, between the extreme material and the extreme psychic; in other words, that the truth must consist in the harmony of relation between the Soul and the material.

Now, in every form of Psychic inquiry, no matter what it may be, I declare to you; that it is the first duty of each individual that would make investigation, to begin with Mind, for you must understand that Mind is our only avenue to the Soul. It furnishes us the capacity by which we shall measure, weigh, and know all that is possible for us to know of the Soul.

¶ Each student that would investigate Psychology must, first turn to an investigation of the machine that must produce Mind, through the medium of which all investigation must be made, for if one does not know the machine, he is not likely to have a well-defined knowledge of its function or action, and if he does not know its function or action, he will be incapable of telling whether or not it measures up to the standard that it should, and this, being translated, simply means that each human being should make a searching and earnest study of his brain—his nerve system—in order that he may come to know Mind—what it is—how it acts—and what are its limitations.

It is only by a well-grounded knowledge of the brain, then

that one is in position to investigate Mind and through it, the Psychic realm that lies beyond.

What has been the habit in this respect? The habit has been, that those who have made Psychic investigation have been those that know the least about the brain machine which by its function produces Mind.

What has been the habit with respect to the investigation of the Psychic? This investigation has been attempted by those who had no knowledge of Mind, its production or operation. ¶ Is it strange then, that the world is rife with error upon these two important phases, when we consider the media through which it has received its information?

A further investigation of this subject requires that we shall make inquiry as to what knowledge is. Having learned that *Mind is but the function of a physical machine, the brain*, and that in some marvelous way, or perhaps, to style it better, in some immaculate way, knowledge comes to us through it; the next logical step for us, is to inquire, *what is knowledge?* ¶ I presume there is no question that could be put, that would be less likely to be answered than this one question—what is knowledge? I presume that of all the millions of answers we might get to different questions, this question would draw from the human family a wider discrepancy of response, for I am quite sure that no two, at this time, have exactly the same conception as to what knowledge is.

It is the general conception I believe, that it is possible to know to the infinitesimal detail, to the exclusion of the very last doubt—a given thing. I desire to say, that from such a standpoint there is absolutely no knowledge in this world. *We are living, relying upon transmission of truth to us. Therefore, that which we conceive to be knowledge, can rise no higher than our faith in the medium of transmission of intelligence to us; than our faith in what is transmitted to us.*

Therefore, in its simplest definition, knowledge consists, only in that which we conceive to be true. Knowledge consists in that which by the best exercise of our intelligence we believe to be true.

As to knowledge, at the present time, with all the diversity

of opinion, with all the divergent thought, with all the expense of energy upon the subject that is taking place, there are but two general attitudes upon the subject; and therefore, for the purpose of our investigation, the whole matter is at once simple and plain.

Upon the subject of knowledge people are divided into these two classes: First—those that are willing to receive and are waiting to receive truth from others; and Second—those that are looking for the transmission of truth from universal sources through the medium of intuition.

In other words, the one class *that rely upon dogmatic transmission;* and the other class *that wait for universal instruction.* Of these two classes, the first, at this time, forms the vaster number because, as I told you, knowledge comes into cognizance primarily through the medium or avenue of imagination; is clothed and surrounded with prejudice; because there has always been the inseparable desire of those that imagined and formulated theories, to reduce them to permanent record, and to have them transmitted to and believed by *the generations that follow.*

It was because of this, I told you, our libraries teem with a vast lore of theories—dogmas—imaginations, under which there is absolutely no support nor prop of truth, and yet those of the human family, that rely on information from others, are continually receiving this form of intelligence as truth, and continuing to perpetuate it, and so long as they thus rely on this kind of information, they will continue to perpetuate the theories and the lore of ages related only to darkness, error and superstition.

It is a matter of regret that, to a large extent, we are all on the dogma side, because, from the cradle to the grave, we are all absolute believers in things that come to us through certain avenues; for unto those things we do not apply our analytical, comparative reason.

The soft murmured stories of mother over the cradle left in your memory are evolved above the threshold of your consciousness again and again, and you do not attempt to wrest them from their place and destroy them if they are not true.

You rather relegate them to your emotional nature and cling to them as though they were sacred. It is quite immaterial how false they may be.

Where is there a man so disciplined that he can wrest from his inner nature all of the sweet nothings that his mother told him, and cast them from him, because, forsooth, they are not true? Where is the individual that can rid himself of parental counsel, of parental teachings, of the stories and folk lore, the fairy stories, the sweet superstitions of childhood? All the impressions borne to his inner nature in his infancy through the avenue of fantasy and dreams?

All those errors are existing in the warp and woof of our being as truth, and let me call it to your attention that these impressions, so long as they exist, will warp, injure, and control our reason, our analysis, our logic, and the truthfulness of our physically limited conclusions.

When I make these statements it is with the full memory and consciousness that to be relieved of all of those things, would be to lay away the major portion of that which we have held to be true, noble and sweet as appertaining to this life; and yet that does not lessen our profound duty in the emergency.

The other reference is to all forms of religion. It is quite immaterial to what age, or clime, or people we apply the thought. It as readily applies to the savage, in his unwritten, traditional religion as to civilized man, for there the boy is dependent upon his father for information as to the Great Spirit, and as to all of the related propositions and tenets of religion ☙ ☙

The boy only receives them; he does not attempt to analyze them; he does not attempt to ascertain their truth; he sits silently and passively receiving all that the father transmits to him as to the religion of the tribe; and then he, in his turn, at the proper time, transmits that religion to his posterity ☙ So it is with all the Bibles that have ever come to us, from the most ancient, to our present time.

You must understand that, in the study of that wonderful department of literature, the Bibles of all ages; the evidences that you are examining are but the efforts of those producing

that form of written and printed matter, to make it relate to and connect with Great Soul authority.

That is all that Biblical evidence, regardless of the religion to which it is applied, amounts to in the final and last analysis ❧ As to whether the one or the other is the proper method, I leave entirely to you. Yet, I cannot resist the importance of the necessity, in this connection of cautioning you that, to rely upon the transmission of any phase of information that has been announced as truth, through human agency is always accompanied with the most pronounced danger. If the longing for truth that wells up in a human being means anything to us, it means that we should pursue our investigations until we arrive at that degree of development where we have power to connect with universal intelligence, and continually receive universal truth, unalloyed and undisturbed, as it shall come to us.

That brings us to that phase of receiving information, that we have called intuition; for you will understand that intuition is the one quality of Mind by which universal truth is connected with Mind attributes, reason, comparison, imagination, analysis, and systematization.

The quality that we refer to as *intuition*, when considered as a mind attribute, may be properly called *deduction*. Society at large is guilty of a very peculiar and remarkable error with respect to intuition or deduction.

The reason for the error is that it has been announced, as it has been in these lectures, that intuition—deduction, is the direct acquisition of universal truth from the Soul, which is in touch at all times with the transmission of universal truth, and it is supposed that this quality of Mind is incapable of error ❧ ❧

In discussing this subject, you will have this question put to you: Well, if deduction is the mind phase of intuition, and intuitionis the immediate recognition of universal truth, then *why is it not easy for us to be always possessed of universal truth?* Why should it ever be possible for us to *go astray?* Why should it ever be possible for us to *commit error?* And why are we not always in *possession* of a knowledge of *universal law?*

¶ The answer to these questions is that we are only able to receive at one time a fragment of truth, and you must remember that we are receiving that fragment of truth, through the attributes of the material—the Brain produced Mind, which is subject to all physical weaknesses.

I desire you to get this thought fully—*intuition-deduction* and from the human standpoint they are the same—must be accomplished through Mind, and *Mind is susceptible to all physical weaknesses*, and can never be more accurate than the functions of the brain that produce it. With this understanding, you will better comprehend the conclusions I am about to reach.

By physical weaknesses I mean improper construction of the human brain, which, as you know, is influenced by heredity; influenced by innumerable adverse human relationships, which I cannot pause to discuss at this time, to such extent that the brain so produced cannot function to produce normal Mind, and yet *Mind is produced that has potential deduction*, but which is *obstructed—clouded—weakened*, in transmission by the very relation of the elements through which it is produced; and you must remember that even the most powerful Mind is not capable of much deduction.

All Minds are subject to disturbance by atmospheric conditions and by animalistic tendencies. By animalistic tendencies I simply refer to all of the things by which we are connected to physical existence, to wit: the necessity for food, air, sunshine, exercise, all physical necessities to sustain animation are nothing but animalistic tendencies. These environmental conditions exercise an influence upon the attributes of Mind by changing the physiology of the brain, thus affecting the capacity for intuition—deduction.

Then again—ordinary sensation—special sensation—tissue sense—books—pictures—etc., continually obtrude themselves upon the deductive ability of Mind.

If it were not for all of these we have a character of disturbance that is graver—the obtrusion of mental processes.

¶ You say you find it difficult to secure concentration, because, just as you are about to concentrate upon one thing,

in pops another. Do you understand what that means? Do you understand the significance of that? It means that there are concomitant mental processes that necessarily oppose each other.

For example comparative analysis is an affirmative process, and is opposed to the passive process of deduction.

Then there is the obtrusion of belief that is opposed to the truth to be intuitively received. Give this thought your best attention ☙ ☙

Just about the time you have reached the attitude in which it is possible for the Soul to give you, through the process of deduction, a universal truth, you close the avenue, by an adverse faith, dogma, or belief, and the universal truth is held back and you may never receive it.

Space will not permit me to go far into these details. I can only point out and indicate them to you, that you may follow the further consideration of them. I must leave it to the emergency of experience for you to make application of these principles and to apply this knowledge.

Proceeding with the inquiry, when is it possible for a human being to exercise that wonderful quality of Mind called deduction? It is only when all obstructions are removed. When you consider this proposition from the aspect of removal of all obstructions, you can understand why the human family has grown in intelligence so slowly.

Think just for a moment of your own experience. Can you remember a single moment in your life when intuition-deduction, would have been possible for any considerable length of time? ☙ ☙

When have you been willing to receive truth that might annihilate the fondest hope for future experiences? When have you been willing to have transmitted to you a truth that would destroy every belief that you have held to that moment? ☙ ☙

I desire to say that I question whether you have lived one second in that attitude, and there are very few individuals that ever evolve to the place where they can look eternal destiny in the face and say truthfully: "*I am ready to receive*

the truth, regardless of what effect it may have upon me and mine." ☙ ☙

However, that is the attitude for intuition, for deduction, for transmission of immaculate truth.

Because of these things, another grave error is indulged, by the people. It is thought that great preparation must be made to receive intelligence intuitively—deductively, but strange as it may seem, the simplest preparation is the most profound ☙ ☙

We see the most wonderful manifestations of intuition in the babe, but an hour old. It is prepared for intuition and is receiving intuitional influx of intelligence.

It almost immediately knows that it must perpetuate its existence by respiration. It must perpetuate its existence by food. It must perpetuate its existence by muscular activity, and all of the other processes of life. This intelligence is given solely by intuition—the impression of universal truth.

When you understand that, you will know what the meek and lowly Nazarene meant when he said: " Unless you become as little children."

And I say to you, unless you become as a babe, you cannot be the recipient of intuitive information. For the time *you must render your Mind completely blank. You must render your desires absolutely nil*, if you would receive universal truth through the means of intuition-deduction.

For further illustration, the phenomenal children that have been observed at different times, have come into existence peculiarly, for the purpose of emphasizing this wonderful fact ☙ ☙

You have known, or read accounts of children that at a very early age, have produced wonderful improvisations on the piano, violin, or in song, equalling the masters, but when they were educated mentally, they lost their musical superiority, because, forsooth, in acquisition of things mental, they lost the quality or power to listen to the " still small voice " of intuition ☙ ☙

The mathematical wonder, Zerah Colburn, a little child, at the age of eight or nine years, playing with his blocks and

toys upon the floor, could solve the most remarkable and intricate mathematical problems. As soon as the proposition was stated to him, he gave the answer, not waiting for mental calculation, but instantly the answer came, many times consisting of six, eight and ten figures.

When they attempted to educate this child in mathematics and he learned to add, subtract, multiply and divide, he could no longer solve these wonderful problems, but was a mathematical nonentity.

Thus, *again was demonstrated to the world in a most remarkable manner the law of intuitional transmission of intelligence.*

The law of intuitional transmission is demonstrated to us in our everyday walk and conversation; in our everyday experiences, in the moment of emergency, when no mental or material aid is at hand or can be used; the wonders of intuitional transmission of intelligence in the matter of self-preservation is illustrated to us. I have experienced that several times, and I believe it to be a common experience of all. It undoubtedly has been so with you, if you have been observant of it.

Now, if intuition can be thus obtruded upon, if it can be so easily occluded, if the loss, or even partial loss, of Mind prevents intuition, if intuitional transmission must be accomplished through means that are so frail, what answer shall we give to the question—are intuitions always the truth?

The answer is—yes, absolutely. But it must be remembered, with caution that the difficulty comes in separating that which is *intuition from that which is not.*

Intuition is *always truth;* but the individual must be exceedingly careful to separate intuition from that *which is not;* but which may be influxed at the *very same instant,* and in that particular phase lies the danger of error.

Errors in this respect have caused much sorrow and adversity to the human family; have held back mental evolution and Psychic development for centuries.

This arouses another inquiry—is there a way that we may know intuition? Is there a way that we can know truth that is transmitted to us through the process of intuition? Again,

I say to you, without any fear whatever—absolutely—yes ☙ Now, let me stop at this point and interpolate this thought. You understand, we have arrived at a place of investigation that requires the most profound, intense, careful analysis and discipline ☙ ☙

The novice could not tell the difference between *intuitional intelligence* and intelligence that is *only reflected as memory* from the Soul.

It is for this reason that I made the statement, that preparation—development—is essential. That is to say, a study of *brain* and a study of *Mind* is necessary, to prepare the individual to investigate at this stage.

This is the test—anything that is transmitted to you, while you wait in the attitude to receive; in the attitude of the little child; the passive attitude, that produces *the slightest doubt*, the *least disposition to inquire further*, you may at *once register as not being universal truth.*

On the other hand, while you thus wait in the passive condition ready to receive, and with no obstruction to the receipt of intelligence, that which comes to you and *does not arouse in you any impulse to make further inquiry, you may register as being universal truth, or intuition.*

Now, laying all other things aside—is this knowledge of any value to us, and first of all, when can we acquire this kind of information? Can we acquire it while we are involved in the daily walk and conversation? May we accomplish receipt of this kind of information while busy with practical things? I answer—yes, most assuredly.

You must remember that in the eternity of Soul existence, an instant is as a million years, and a million years is as an instant. *An influx of universal intelligence can come to you in a space of time so short that it would be impossible to measure it, and completely fill you from head to foot and surcharge you with its value and power.*

It is possible for an individual to learn to be so synchronous, so continually a listener in passivity for the transmission of universal intelligence, and environmental intelligence, that both forms may be constantly coming to him, filling, evolv-

ing, regenerating and bringing him nearer and nearer to universal harmony.

We are limited in our acquisition of knowledge to intuition—deduction. There is no other, there has never been another, there never will be another channel through which we may receive universal intelligence. *We must get universal truth, if at all, through intuition.*

And the statement last made does not negative any form of religion that exists in the world today. For if any Bible is truth, the substance of that truth was transmitted through the process of intuition.

Intuition—deduction is the only way universal intelligence may be transmitted to us. *It is the only way it has ever been transmitted, the only way it can ever be transmitted.*

These statements become perfectly clear, when we look the situation squarely in the face, for you will understand that all the religions of the world hold that they obtained their basic principles from the God of the Universe, called by whatever name, which is, after all, *nothing but the transmission from the Great Soul, of universal truth through the process of intuition to human beings.*

How does universal truth come to us? It comes through all of the multifold avenues of our being, that have been described in this course of lectures; that is to say, *through tissue sense, common sensation, and special sensation.* It also comes *through our four other senses*, and this is but the equivalent of saying that it comes *through all media of suggestion* ☙ ☙

And aside from these usual and, therefore, more common ways universal truth also comes through *clairvoyance*, which means clear-seeing—*clair-audience*, which means clear-hearing, or to use a term that combines all of these, *clairsentience* —telepathy ☙ ☙

It is perfectly clear that all universal truth that human beings have ever received has come to them through telepathy or Soul-communion; that is to say, by influx from the Great Soul through the medium of the Souls of individuals.

Intelligence received in this way is sometimes referred to as

coming through an individual in a state of trance, in connection with which I desire to make myself clear.

Trance is a form of hypnosis which may be self-induced, or induced by extraneous influences. The information received will, of course, be telepathic, for trance puts Mind in abeyance, and leaves the channel of the Soul open.

There is a way by which knowledge of events that have not yet taken place, it is said, may be known, through what is called premonition.

As to this phenomenon, I desire to say, by way of explanation, that the transmission of intelligence of this character, by premonition is the most difficult for us to understand of any that has been referred to, or discussed. And this is true because we have been so definitely and carefully schooled to our material limitations. The impossibility of acquiring knowledge of events before they occur, through a means common to all, has always been carefully, and most impressively taught to us.

However, *if you believe that God is possessed of omniscience, omnipotence and omnipresence, and that your Soul possesses those powers potentially—you must also believe that God's knowledge is from the beginning; is comprehensive of everything and that your Soul, having these powers in potentiality; is possessed of the means of receiving all knowledge.*

Believing in the named God attributes, you must also believe that an event which has not yet taken place is as much a part of universal truth as though it had. And, therefore, under the very most favorable circumstances, you must admit that your Soul may receive from the Great Soul a fragment of such truth comprising one event that has not yet been enacted, and evolve it into your consciousness.

You would not expect such an immaculate event to occur in every life, or to occur with any degree of frequency, but you would expect that, under the exactly proper circumstances, such transmission would occur.

There is a caution that each should observe in the investigation of these remarkable psychic things, and this should more especially be observed with regard to telepathy, trance and

premonition. *In order that phenomena can be accomplished by these means, the sentinel at the gateway of the Soul, must for the time be dismissed.*

To secure such transmission that wonderful guide and protector in this physical realm; the reasoning, comparing, analyzing Mind, must be put to sleep. *And it must be remembered to what awful dangers the individual is exposed while in such condition.*

In the first place, when Mind is in abeyance the individual is to a large extent, the plaything of those he loves and through their rapport and his willingness, they may sow seeds of adversity that will produce many fold. In such condition he may be the recipient of much information, which may be wrongly construed and impressed upon his Mind, either by those with whom he is in rapport, or by himself.

There is also the general likelihood that an individual will not understand the truth received, for it must be remembered that *it comes by influx and as an entirety and will have to be translated into language*, a task of the greatest nicety, as any one may see, by an individual in the fullest possession of mental powers.

From what has been said, it should be perfectly clear that human beings should not meddle idly with the Soul side of their being and should approach it, and the phenomena presented by it, with a sense of the sacredness of it and the importance of the task.

The phenomena presented to us through these means must never be considered as being for *our pleasure*, but *solely for our instruction*, in order that we may *have a means of knowing* our relationship to the *Great Soul*, and therefore, should be esteemed by us as being holy and not to be approached, except in that spirit and attitude.

When we have in the proper spirit obtained information, through any of these means, or universal intelligence through any means, we must remember that *it is our first duty to use all of our Mind powers in a complete understanding of the information received.*

That is to say, we must bring to bear upon the information,

the powers of deduction, reason, analysis, comparison and systematization to the end that we may *form a correct construction of what we have received, secure its correct impression, and application to the material environment in which we must use it.* This phase of occupation is after all *the fundamental basis of education.*

My friends, in closing, let me assure you that it is my hope that as you pursue this study: that as you seek to learn from the Soul, you will first come to a full recognition of the wonders and powers of Human Mind; that you will come to understand Mind, its exalted place—*the sentinel of the Soul.* ¶ I hope you will come to recognize that Mind is your *first, nearest* and *best friend; for through it you must learn all that you will ever know in this life.*

And having realized these important things I trust you will devote sufficient study to the brain that must produce Mind, to comprehensively understand it and therefore, to better understand Mind.

I caution you to keep Mind, that matchless guardian of yourself, the translator of Soul intelligence, the censor to yourSoul, in the highest esteem, always in its place, in order that you may accomplish the beautiful synchronous life, matchlessly illustrated in the story of Jesus.

LECTURE NO. 7.
JUNE 19, 1913.

Healers—Ancient and Modern

MY FRIENDS: The subject for discussion this morning is relative to those that I have taken up before; but it needs no recapitulation, because the reference is broadly to all that has been developed to the present time. ¶ The lecture this morning is historical; it is also scientific and analytical.

A student of history is always struck with the fact that so-called healing is always a religion.

It is quite immaterial how far back you go, indeed, if you go back to tradition, the healing-religion element is just as pronounced, just as marked, as it is in society today.

We are prone to conceive the idea that as time passes we change remarkably; that old conditions are left entirely behind and that we assume new modes of life and relative intelligence ❧ ❧

I desire to call your attention to the fact, that the different periods of history of which we have any accurate account, are only presentations of the Human family under different, but related, circumstances, that reveal to us and overwhelm us with proof that humanity has been much the same in all periods of the world.

I have tried to show you, that the human family has been peculiarly a religious family. It has been interested, aroused, animated in its search, for that which was superior to it, by which it could account for its existence.

Most of the time—most of the thought—most of the effort of the human family in all times and in all climes has been to trace its origin back and connect it with that conceived to be the God.

So, in taking up the subject of healers, all those things remain unchanged. We must expect to find the human family the same respecting this subject as we found it respecting other subjects.

The subject of healing is one of the pronounced and prominent parts of the history of all peoples, ancient and modern.

The phase of devising new rules, new forms and new methods are always a part of the history of healing, and when we scrutinize health history with earnestness and care, we find that healing has always been a religion.

If you stop for a moment and only materialistically view the situation at the present time, you say that the last statement is not true. You say that you see no relationship of a religious nature between medicine of modern times and religion. ¶ I declare to you that the system called " the science of medicine " is just as completely a religion as any other system of so-called healing. There is this difference, however, the votaries of this system do not know that it is a religion, while in others, and in some especially, they know the religious aspect and that alone, but do not know that there is connected with their religion of healing the same phase of material incidents that there are relative to medicine, and in some instances even more.

If you will investigate history generally, you will be surprised to find that one of its most pronounced phases, is with relation to healing.

You will find healing a prominent phase in the history of China, Japan, Egypt, Greece, Rome, etc. It will be found true of Greek mythology and Roman mythology. You will find the same to be true of all mythology and the history of all peoples.

Again, when you turn your attention to the aborigines of any country, you will be surprised to find that healing is the most prominent thing in their citizenship; in the laws and customs of the tribe.

If you will investigate the reports given by Livingstone and Stanley as to Darkest Africa and the people inhabiting it, you will learn that the most striking feature of their social

condition consists in their belief as to healing. Each tribe has its peculiar religion of healing.

All healing systems are part of a religion. And all systems ascribe their power to heal to the God, whether they conceive it as the Great Spirit, the Divine Mind or any of the multitudinous names for the Deity.

In the history of Old Mexico as given in " The Fair God " by Lew Wallace, you will be astonished by the remarkable religions revealed and the fact, that for health they sacrificed many persons and performed incantations and services of one kind and another to appease the anger of some god, for the purposes of bringing that god to look kindly upon the people of Mexico, restoring their health and strength.

You will find that the aborigines of Ireland, Wales and Scotland had a belief not particularly different from the American Indians. They believed in the Great Spirit; not in the God of civilization, but in the God of savagery. They believed in sprites and fairies, and that the air was peopled with such life, to many of which were ascribed the power of gods, to control the health and life of the people.

Again, among the peoples that have lived in the more inaccessible portions of the earth; the plateau of Thibet; the fastnesses of the Orient generally, and indeed, the fastnesses of our own United States, you will find beliefs in tokens, signs and sayings that are as religiously superstitious, and to which their votaries look for healing as completely now, as in the most ancient days.

We remember the various signs, tokens, soothsayings, medicine men, incantations, etc., that belonged to the religion of healing of our American Indians. Longfellow has made literature bright and beautiful with these old things; with these old signs, symbols and tokens, and I need not stop to expatiate upon them.

It is sufficient to say in passing that they were all a part of the health-religion of those peoples, and the power to accomplish the health results, that they did, was because they believed that by the means used they could invoke the favorable action of the Great Spirit.

If an individual was sick, it was because the Great Spirit was displeased. Therefore, certain sacrifices, certain dances, certain song services, certain destruction of property, certain lacerations of the flesh, certain prostrations must be accomplished to bring the Great Spirit out of His anger, so that He would again look with favor upon the individual and restore him to health.

These customs persist among the Indians of our country to this time, and are still a part of their religion. One of the most difficult things in the civilizing of these people, has been to rid the Indian Mind of these old religious customs and faiths.

¶ Likewise you will remember the stories of Hindu mothers, on the banks of the Ganges, throwing little innocent babes to the crocodiles to appease the wrath of an angry god and again bring themselves or their people into favor that they might have health and life and something upon which to subsist

This same phase appertains to the so-called civilized religions. You will find that healing is a part of Brahmanism; of Buddhism; of Confucianism, of Mohammedanism. I do not mean to stop by saying that it is a part of these religions. I mean to impress you with the fact that healing is a prominent part of all religions.

The Christian religion, which is also Oriental, is not an exception. Healing, next to salvation, is its most prominent and important theme. It assumes to have presented to the world the greatest Healer it has ever known.

I need not pursue this theme further than to call your attention to the fact that the Christian Bible teaches, as parts of the system of healing, the laying on of hands, bathings, anointings with oil, soothsayings, casting out devils, etc. All of these are but different characters, methods and modes of restoring health, by appeasing the anger of God.

Having advanced so far in our thought, we have undoubtedly realized as never before that healing has always been a religion. In other words, healing has never been divorced, in conception, from the power that may be caused to emanate from God. In some peculiar and indefinite way, there has

always been demonstrations of belief going on that healing is accomplished by securing favorable emanation from God. ¶ The difficulty is that people have never understood what healing really is. They have failed to grasp the important fact, that instead of the word healing; instead of the thought of healing; instead of the thought of removing disease, they should think of *unobstructed formation* in which there is *no need for healing*. That is to say, *as to a normally formed organism, living according to the laws of its being, healing is an impossible thought. This fact is entirely overlooked by people with regard to the subject of health.*

If, without this introduction, I had said, there is a similarity between the health religion of Mohammedanism and Christianity; between the religions of the savages of Darkest Africa, and the Christian religion as respects the subject of health, you would have repudiated the statement and perhaps would have disparaged my intelligence.

As I have developed the subject, I trust that you can see, that there is the closest similarity among all these; that as to their healing phases they all rest upon exactly the same foundation; and that as to their basis for healing there is no difference ❧ ❧

In the religion of all times, peoples, races and climes, one thing always stands out predominant, and that is *faith*. It is quite immaterial whether you are a Mohammedan, a Christian or a savage, you have faith in the religion of your people. You have faith in the tenets of your own religion. It makes no difference what they are, you believe in them respecting all subjects, including healing, and in as far as you believe the tenets of your religion, with regard to healing, you are precisely like the votary of any other religion, on the subject of healing.

Let us consider another important fact that applies to all religions. It is quite immaterial whether there is any truth in the religion, or not, its healing phases are just as successful. ¶ Indeed, *it is immaterial, and unimportant whether the religion be true or not, if you have faith in it, believe its tenets, believe its teachings as to the healing of the sick, and with full faith act*

upon them, you will derive the same benefits as though the religion were true.

You think there is nothing in all the dances, fandangos and faith in the superiority of the medicine man of our American Indians. You are very positive about that. You are positive that there is absolutely nothing in their religion. You say it is founded upon imagination and tradition; that it possesses no authority except that it was handed down from father to son; that it does not rest upon a foundation of fact, and all your conclusions may be correct.

However, if you will go among the Indians, and examine the evidence, you will find that the Medicine Man of each tribe has performed things for health that can be explained upon no other hypothesis than that of religious belief or that of miracle.

The Medicine Man had only to make one of his peculiar incantations, songs, prayers; one of his endeavors of whatever character over the sick, and in many cases the sick were immediately well. Why? Was the Medicine Man a representative of God? Not at all. Was he even a representative of the Great Spirit of the Indian people? Not at all. Then what was the cause of the remarkable results?—*The individual had absolute faith in the health religion of his tribe and, therefore, in the power of the Medicine Man to heal him.*

If you will investigate the records of Ancient Mexico, you will find proof of the most wonderful return of individuals to health under their religious rites, and still that religion has long ago passed away with the people that believed it.

The religion of Ancient Mexico consisted in paganism; in idolatry. It set up gods, to which it gave names, and to which it referred certain powers; and for the pacification of which many human sacrifices were made, resulting many times in marvelous restorations of health. Why? *Because the people of that country absolutely believed that the restorations would follow upon the sacrifice.*

A Hindu will sit for days gazing at one object, without moving a muscle of his body or blinking an eye, for the purpose of accomplishing ascendancy over his flesh; for the purpose of

acquiring mastery over his body, and driving out of it all that is obnoxious to health. He believes that he can do that, and to a great extent he does it. He becomes a master. He rises superior to his body.

The Hindu lives for weeks and months without food. *He performs feats that many people would classify as miraculous, and he does it solely through faith that he can do it.*

We all know that the Christian Bible is full of the teachings of prayer, fasting, bathing, anointing with oil, and dipping in the Pool of Siloam, the river Jordan, etc., for healing. We now know that the river Jordan was about such a stream as the North Canadian; that there was nothing healing about its waters, *but that faith in the promise caused health in the individuals who obeyed the injunction and dipped in the river Jordan.*

¶ You remember that certain persons were instructed that if they dipped three times in a certain manner in the Pool of Siloam, they would be cleansed and upon this dipping they were healed.

It was not the Pool of Siloam itself that caused the healing, for it still lies there in its rocky walls, its waters still bubble over the edge; but today, we do not imagine, there is anything curative in the waters of that pool.

The results in Bible times were *because the people of that time believed that if they obeyed the injunction, health would follow the obedience.*

Now there is one other very important fact that we must take into account at this particular juncture. Healing requires more than faith. *It also requires works.*

The individual must not only have faith in the particular tenet of his religion, but he must walk, guided by that faith; must follow his faith with works that prove his faith.

If the devotee adds to his faith works, then it makes no difference whether the religion is savage or civilized, ancient or modern, false or true, *the result is that he will attain, in some degree, that which he believed would follow; that which is promised to follow.*

What are our representatives today of ancient religions? Have we any representatives of the ancient religions that have

largely passed, with their votaries, in our modern civilization? I say, yes. We have Mohammedanism, Buddhism, Confucianism, Brahmanism, etc.; but I will not stop to discuss these ☙ ☙

The Christian religion has come down to us also; but let me interpolate at this point, that *although its Bible contains some very valuable teachings on the subject of healing, yet there are very few professed Christians that pay any attention to them.*

The Christian Church, in all denominations, has left its Bible, regarding the subject of healing, and has gone off after false gods. It has taken up medicine, and made of it a religion of healing ☙ ☙

The professed followers of the Christian Bible, today, do not rely upon its teachings for the recovery of their health in any respect, and especially with regard to healing. They have adopted instead the M. D. and his dope.

Aside from those that I have named, as being representatives of ancient religions of healing, we have those that I shall discuss for the purpose of showing their relation to each other, and their relation to the religion of healing that I have been developing in this lecture.

I shall for this purpose confine myself to the period classified as modern times, and to subjects with which we are all familiar as being a part of the common discussion and folklore of our times.

Mesmerism was founded in 1776. It was practised by Mesmer until his exile from France. It was then practised by Braid in Manchester, England, and generally, in a sporadic way by a great many, and it exists among us today in what is called psycho-therapy upon the one hand, and magnetic healing on the other. I shall have more to say as to psycho-therapy in the next lecture.

Magnetic healing developed from Mesmerism. When Mesmer dropped the idea of the use of the magnets to induce sleep he evolved the theory of animal magnetism from observing the work of a Catholic priest.

The priest secured mesmeric sleep by manipulation with his hands, and proclaimed that a fluid left his body and entered

the body of the patient. Mesmer adopted that doctrine and it has gone on getting a greater hold and broader construction until it has become what we call today magnetic healing, which is practised exactly as the Catholic priest practised it, except that the sleep is not produced.

It is still believed that the magnetic healer casts from his body a magnetic force that enters the body of the individual and drives out of him pain and sickness.

It is a common belief among the followers of that system that magnetic healers have a peculiar way of driving the pain or sickness into some part of the body, and then rolling it up as though it were a ball, and lifting it out, and that sometimes the healer for the time being is compelled to take it into a part of his own body, and then cast it from himself. I do not know where they think it goes. We can only conjecture.

Spiritualistic healing came into existence in about the year 1850. It consists in the belief that the healer is in immediate rapport with the discarnate soul of some individual that understood healing while in this life, and because of the ability to go about more rapidly on the spirit plane, can furnish better and more comprehensive facts as to the subject of disease, and as to the methods to be employed for its removal than is known on this plane of existence.

Spiritualistic healers adopt all kinds of fantastic methods which, they say, they receive from spirit communications, and we are not privileged to deny what they say. Many of them use methods of ancient times, that would not be recommended by our common sense at this time. *Yet, there is that same peculiar religious belief, and the same definite and marked results following the efforts of those individuals in many instances.* I cannot pause to give you, in detail, all that might be said upon this subject. I can only give you something of its scope.

This brings us to the subject of so-called divine healers. They imagine that they can heal the sick by the laying on of hands, by affirmations of health, etc., and the individuals to whom they have applied these methods; the individuals upon whom they have laid their hands, *that have had faith and have*

done what the divine healer told them to do, have, in many instances returned to health, and many remarkable cures are claimed as following in the train of such services.

Mental science is substantially the same thing, and consists in holding the mental attitude of health, in opposition to the attitude of sickness or disease. *Individuals that believe this kind of treatment cures, achieve many wonderful results.*

Now all of these methods or systems *are based on the same thing*. Each and all of them, as you can plainly see, *are based upon the proposition of faith, willingness to do what is necessary, and then by works, doing that which is required.*

The last of these that I desire to take up is that most peculiar and remarkable association of individuals of our modern times that has existed since 1876, called Christian Scientists.

¶ The most remarkable thing about Christian Science is, that there is absolutely no *science* about it. Also that there is *no truth* about it, and yet today, it has the largest number of followers, in proportion to the time it has existed, of any religious body that ever came into existence.

I think I could not deliver a more complete indictment of the human family, if I should try for forty years, than that which I have just pronounced in your presence. Now I am going to show you that what I say is absolutely true, tested by the evidence of environmental demonstration.

Before introducing this proof, I desire again to call your attention to the fact that *we must stand by Mind, the function of the human brain, because it is the beginning of the channel through, and by means of which, we may know anything. Without our poor, frail human Mind we would not even know of this existence. Let us remember that.*

Christian Science was founded in about 1876 by a woman that had possessed very many different names, but who was known quite generally over the world, before her death, as Mary Baker Eddy.

I do not know that it is against any individual that he, or she, has had many life partners, as did this woman; but in passing, I would suggest that the multiplicity of partners does not tend to strengthen our faith in her supposed belief in the non-

existence of matter, but rather tends to show, that she took a pretty keen interest in the *genus homo maleo.*

There is a great deal of cloud, mist and darkness covering the period of her acquisition of the so-called knowledge that forms the basis of this religion. Indeed, it is gravely questioned whether she herself got the information. It is absolutely proven that it did not originate with her; that what she said and how she said it was borrowed from others. However, this much must be said for her; she directed how it should be put together ❧ ❧

I take off my hat in willing admiration of Mary Baker Eddy when I say this: *that for sheer, abject, consummate, scintillating deception, she stands today above all of the people that have ever lived on this earth. She has directed the production of a book that contains more untruth, that the ordinary mind is incapable of isolating and discovering, than can be found in any other literature that has ever been produced.*

I defy any human being to read one paragraph from the book ascribed to Mary Baker Eddy, " Science and Health, With Key to the Scriptures," and find in it either *truth or falsehood separately* stated.

I will show you that this book, from beginning to end, contains the most consummate falsehood. I will also show you that *each falsehood* is inseparably connected with an *undeniable truth*, and that the *true and the false are so intricately and delicately interwoven that it is absolutely impossible for the unprepared mind to separate the one from the other.*

This book has gone out to the world and has chained in darkness and ignorance a larger number of people than any other one secular book has ever done, and those people must live in that error until they evolve to such mental ability that *they can winnow the truth from the error of this book and come to understand its falseness.*

The way to test the value of anything is to investigate its basic principles.

If you wish to find out whether some one is lying to you, you institute a careful cross-examination. And why do you insist upon cross-examination? You do that for the purpose of

resolving what has been said to see if it rests upon the truth. ¶ It is perfectly clear that *if the basic principles contained in Mary Baker Eddy's book are not true; are not believable; are not reconcilable, then all that she predicates upon them must be just as untrue.*

Fellow students, if I should announce, the basic principle of Chiropractic, and you should, by analysis, find, that it was absolutely untrue; that it was absolutely unbelievable; that it could not be demonstrated, you would say to me—*Chiropractic is a lie.*

If I should assert anything to you, it makes no difference what, and you should ask me for the basic principle upon which my assertion rests, and I should tell you; and, if, after analysis you should find, that the basic principle was absolutely untrue, then it would make no difference how profound or logical my conclusions, thus based might have been, you would declare *each one of them to be false*, because the *basic principle was false.* In that you would be right.

Now just by way of test, we will examine "Science and Health, With Key to the Scriptures," in detail. By cross-examination we will investigate the basic principles of Christian Science.

I desire to read from "Science and Health, With Key to the Scriptures," and in the beginning I desire to call your attention to this very subtle title—"Science and Health, With Key to the Scriptures." There is not a human being living, who can take *this key and unlock a single statement in the Scriptures.* ¶ I read from page 113: "*The fundamental propositions of divine metaphysics are summarized in the four following, to me, self evident propositions.*"

What does that mean to you? It means the same as if I were to say to you that Chiropractic rests upon one fundamental biologic principle, "*that radiation of nerve stimulus through organized channels causes all animation.*"

This one statement of the four fundamental propositions is the absolute, ultimate of Christian Science. Mrs. Eddy says, *that the whole superstructure rests upon them, and that they are, to her, self evident.*

" Even if reversed, these propositions will be found to agree in statement and proof, showing mathematically their exact relation to Truth." That is to say, if you read the four statements the other way, they become mathematics and prove their relation to truth. Do they?

" De Quincey says mathematics has not a foot to stand upon which is not purely metaphysical." Everybody knows that fact, but notice how subtly she interweaves other things that are true, as though De Quincey had said that *these four propositions* are not only *mathematical*, but that *they are true*. De Quincey never heard of such propositions in his life.

¶ Here are the four fundamentals of Christian Science:

(1) " God is All-in-All."

(2) " God is good. Good is Mind."

(3) " God, Spirit, being all, nothing is matter."

(4) " Life, God, Omnipotent Good, deny death, evil, sin, disease—Disease, sin, evil, death, deny Good, Omnipotent God, Life."

The trouble begins with the second part of 2. If " Good is Mind," and God is good, what does God think about: How does God think? Is it possible that God should be, or have Mind? God is Soul; God is omnipotence; God is omniscience and hence, it is impossible that God has or is a Mind. *God is father of Minds*. God is the *builder of brains* in which by *functional operations Minds are produced*, but God is not Mind. Mind is a means to knowledge: *God is all knowledge*.

¶ (3) " God, Spirit, being all, nothing is matter." Where does she get that word *spirit* from? The first proposition states that " God is All-in-All." If God is All-in-All—*there is no Spirit* ☙ ☙

" God, Spirit, Mind," and as many other things as you want may be thrown in and stirred around so that they can come in later, just at the proper time. In fact, the author's method is to throw in all the junk you want, on the ground that it may come in handy somewhere.

" God, Spirit, being all, *nothing is matter*." If God is all, of course there can be no matter, unless some of God is matter, and some of God may as easily be *matter* as *spirit*, may He

not? ¶ Of course, if "God is Good and Good is Mind," and to reverse it, "Mind is Good, Good is God; and God is All-in-All," then *matter does not exist*, but where does Mind come in? Why should there be *Mind* any more than *matter?* Notice the subtle reference, and bear in Mind that "God is All-in-All," and that human beings have, neither Mind nor body, unless they are God. That is what Mary says; but you know, I feel a sly doubt creeping in.

(4) "Life, God, Omnipotent Good, Deny Death, Evil, Sin, Disease.—Disease, Sin, Evil, Death, Deny Good, Omnipotent God, Life." I submit to you that Mary Baker Eddy did not know what she meant by this fourth proposition any more than I do. This is an example of her junk stirring, to have anything she wanted, bob up at the right place and time.

There is one remarkable thing about these four propositions. You never saw a Christian Scientist in your life that would argue to sustain them. They will not discuss them at all, and really I cannot blame them. If my religion had such a flimsy basis, I too, would keep still about it.

If you press them for discussion they will tell you, you have not the *power;* that you have not *arrived at the refinement;* that you are under the influence of *mortal mind.* Seeming to forget for the nonce that *they are talking* to you and avoiding discussion by use of *Mortal Mind.* Christian Scientists seem to forget, when pressed for discussion that they see "through a glass darkly" and still they say you have not arrived. You are riding a freight, so to speak. You have not arrived. You are on a cold bumper; are out of the fold, in other words, and until you have arrived at the refinement you must not talk. I submit that after one has arrived, there is no occasion to talk. It is during the journey that one wishes to talk. It makes no difference by what route you come, it is along the journey that you would like to discuss these very disconcerting things. ¶ A Christian Scientist will not discuss these propositions with you. He will tell you to come to their reading circle, but not to talk—just to, *go into the silence*—let the shadows fall upon you—be rejuvenated—be happy—forget disease—consider yourself nothing—become a naught—become a cipher

to fill a " vacant order "—loosen up—cut your suspenders and ascend into the glories of nothingness.

Now let us take proposition 4, and examine our animal existence with its propositions in Mind. Let us investigate it, if you please, as we investigate any other subject that comes before us. Let us not become frightened. Let us not think that we are entering into the shady zone of unreality.

In this examination let us throw back our shoulders and poise our heads, remembering that *coursing through this clay there is Soul energy, that has given us Mind, with which to investigate phenomena about us. Let us, in all the pride and vigor that comes through our Soul, from God, investigate what this woman has published.*

I have stood by and observed Christian Scientists, in silence, now for many years. I have known them intimately. I have transacted business with them. I have doctored them. I have been on boards of which they were members. I have been in business relationship with them. I have met them in all relationships of life. I have fought their battles in legislatures and paid the bills myself, because they professed to believe in non-resistance ☙ ☙

I have stood and held my arm over Christian Scientists, metaphorically speaking, that they might not get hurt, because while they " had a claim " that they did not exist and would not get hurt, I knew they did, notwithstanding the " claim," and were in danger. For this I received their thanks, but no other form of compensation, *for they do not believe in wasting money, even though " nothing is Matter " and in such a case they take the benefit of the doubt.*

Incidentally, I have noticed that Christian Scientists are very industrious in one particular, and that is in their animalistic tendencies. I notice that they are very active in bringing into existence, " nothing is matter " that they name Bobby, Tommy, Willie, Sallie, Mary, etc., just as other humans do. Somehow this makes me think that they believe that " something is matter," or that something is the matter, or they would not do it.

The Christian Science mother looks into the eyes of her

child with the same loving devotion that any mother would look. The Christian Science father dotes upon his children and educates and cares for them as well usually as other fathers care for their children.

I say to you that it is what you do, under intuitive knowledge, under divine instruction, not what you say with your lips, that proves what you believe.

Christian Scientists have societies for discussion of dietetics, exercise, culture, refinement, education, art, music and science. Do people attempt to acquire what does not exist? Do they attempt to store what they know does not exist? Will they *attempt to put something that is n't, into a place that " ain't? "*

Imagine a person trying to educate a Mind that does not exist. Imagine him trying to store a memory that never existed. Oh, what rotten bosh! I agree with the sentiment— " Oh, consistency thou art a jewel! "

Christian Scientists, in an emergency, have an obstetrician, at their homes when the " stork comes," bringing a baby. Is n't it strange that the coming of " nothing " must be attended with such tremendous care? *Is n't it remarkable that matter and the laws controlling it, takes such a hold upon those that do not exist? And to whom " nothing is matter."*

Occasionally Christian Scientists take a little " dope " on the side. Oh, just some salts, you know, just some apples to move the bowels; just a little something, you know, to help the old machine along; the old machine that has " *no existence but an erroneous thought of Mortal Mind.*"

Then, sometimes, Christian Scientists slip in at the back stairway, down the alley, or through the lane to their Chiropractic friend. He does not know they do not exist, and he says: " Would you like an examination and diagnosis? " And they reply, " Oh, no, there is nothing the matter with me. I only want some exercises." Then the Chiropractor knows that he has a fellow that " ain't " so he puts nothing down upon the adjusting table and proceeds to exercise what could n't was, and gives to what " is n't " such an adjusting that " nothing " will be matter, and know it for many days.

Indeed, under such circumstances, I have brought *tremendous groans and grunts out of nowhere.*

Now, my friends, I submit, if I were going to write a book, especially if I were going to found a religion upon it, I would not, *announce the basic principle* on one page and on another page *contradict it.*

I have not the time to give you all the contradictions that occur in " Science and Health, With Key to the Scriptures." I can find more than one thousand contradictions of the basic principle of Christian Science in this book, stated by the author herself, over her own signature. I am only going to give you a few.

I now read from page one hundred and three, a portion of the book preceding the basic principles, yet you will admit, I believe, that all the statements in a work of this kind should conform to the basic principles, no matter whether stated before or after them.

" The destruction of the claims of mortal Mind through Science, by which man can escape from sin and mortality, blesses the whole human family. As in the beginning, however, this liberation does not scientifically show itself in a knowledge of both good and evil, for the latter is unreal."

That is, *evil is unreal.* If it were unreal, she should not be talking about it, should she? Why is she talking about something that does not exist? How does she know it ever existed? How does she come to be in possession of the fact of its existence? Do you know of anything that *ever existed* that is *unreal?* Could you talk about the existence of something that never existed? You could not. Neither could Mary Baker Eddy. She was just an ordinary " clodhopper," like the rest of us, born and reared in New Hampshire, as I understand.

" On the other hand, Mind-Science is wholly separate from any half-way impertinent knowledge, because Mind-Science is of God and demonstrates the Divine Principle, working out the purposes of good only. The maximum of good is the infinite God and His Idea, the All-in-All. Evil is a suppositional lie."

" Because Mind-Science is of God." This statement seems to indicate that there is science that is not of God? What is science? *It is systematized truth.* Is not all *truth* of God?

" Evil is a suppositional lie." Well, it must *exist*, or it could not be even a " suppositional lie." There would have to be something to it. All *existence* is *truth*, therefore, either evil *never existed* or else it is *truth* and not even a " suppositional lie." And if evil does not exist, why talk about it?

"As named in Christian Science, animal magnetism or hypnotism is the specific term for error, or Mortal Mind. It is the false belief that Mind is in matter, and is both evil and good; that evil is as real as good and more powerful."

Now notice—she says, hypnotism is the *false* belief that *Mind* is in *matter.* Now, if, "God is All " and "All is God " and " nothing is matter "—how can she say, " it (hypnotism) is the false belief that Mind is in matter? " Does she not thereby admit that *matter exists?* She is talking about " *Mind* " being in " *matter.*"

If " *matter does not* exist, Mind *could not be in it*, and if *matter* does *not exist*, it never did and she could not be talking about anything being *either in it* or *out of it.*

" That Mind is in matter, and is both evil and good; that evil is as real, as good and more powerful. This belief has not one quality of Truth. It is either ignorant or malicious." According to Mrs. Eddy then, *ignorance* and *maliciousness both exist*, and if they exist they are a *part of truth*, and if " God is All-in-All," then they are a *part of God.* By her own statement she makes them so.

" The malicious form of hypnotism ultimates in moral idiocy." That is just a plain statement, without any proof of any kind anywhere, and without any reference to proof. Still it *admits the existence* of " *idiocy* " which is a matter-defect

" The truths of Immortal Mind (an impossible conception) sustain man, and they annihilate the fables of mortal Mind, whose flimsy and gaudy pretensions, like silly moths, singe their own wings and fall into dust." This statement admits the existence of brain to produce *mortal Mind*, and such

common forms of matter as *moths*, *wings* and *dust*. "In reality there is no *Mortal Mind*." She has just finished talking of "*the fables of Mortal Mind*" and now says it really does not exist. If it *did not* she could not *talk* about it.

She says that "in reality there is no Mortal Mind." If that is true, then there are no "*fables*" of mortal Mind to have "*flimsy* and *gaudy pretensions*," for unless there is mortal Mind, there could be no "*fables*" *of mortal Mind.*

"In reality there is no *Mortal Mind*, and consequently no transference of mortal thought and will-power." Of course not. If there is no *Mortal Mind*, then there is no *mortal thought* or *will-power*, and, there could be no *transference* of *what does not exist;* but she speaks of mortal thought and will-power, and therefore *must have believed* in their existence ❧

On page 104: "Life and being are of God. In Christian Science, man can do no harm, for scientific thoughts are true thoughts, passing from God to man." A part of that sounds true. Of course, all intelligence passes from God to man, through the medium of the Soul, but not in thought. Our power to think, emanates from God; but it must be remembered that *thought is* and that all that is, *is truth*, even though, because of our limitations, it does not seem so.

"When Christian Science, and animal magnetism are both comprehended, as they will be at no distant date, it will be seen why the author of this book has been so unjustly persecuted and belied by wolves in sheep's clothing." Here we have *animal magnetism* which is a matter-emanation and *wolves* in *sheep's clothing*, two other phases of matter, existing *outside* of God, by the author's statement, that God is All-in-All ❧ ❧

"Agassiz, the celebrated naturalist and author, has wisely said: 'Every great scientific truth goes through three stages. First, people say it conflicts with the Bible. Next, they say it has been discovered before. Lastly, they say they have always believed it.'" She speaks here of the Bible. If "God is All-in-All" and "All is God," then there *is no Bible*, for it is *admitted* that the Bible was *written by man*, by the power of *Mind*, and if mortal Mind is *an erroneous thought*, there

was no result, and there is no Bible. It is a "*fable of mortal Mind*" that has "*no real existence.*"

Bibles are *printed on paper* and other *material.* If there is no matter, then there is *no Bible.* When you think you pick up a Bible you just pick from *vacuity* an *imagination* made of *nothing.* It is *not there.* It is an "erroneous thought" of "*mortal Mind,*" that "in reality has no existence."

Again, on page 149: "Mind as far outweighs drugs (matter) in the cure of disease as in the cure of sin." Well, it seems from that statement that *sin* must have *existed* somewhere and I should think that if it did, it was the result of the wrongful conduct of "matter" things.

"The more excellent way is Divine Science in every case. Is *materia medica* a science or a bundle of speculative human theories?" According to that, *materia medica exists*, no matter what it is, and "materia," means matter.

"The prescription which succeeds in one instance fails in another, and this is owing to the different mental states of the patient." Mary Baker Eddy should have stopped at this juncture and told us how that *prescription succeeded*, even though it never succeeded but once. For if it succeeded, it did so because of *its existence* and *conformity with law*, and as a scientific step, she should have told us, but she did not. *She could not, and maintain her cult.*

"The prescription which succeeds in one instance fails in another, and this is owing to the different mental states of the patient." It is quite immaterial about the mental state of the patient, if the prescription succeeds, for it must have existed to have done so.

If the patient had a *mental state*, and "God is All and All is Mind," where did he get it? If the patient had a *mental state*, he must *have had a Mind*, and if so, he must either *be God* or *else there is Mind aside* from God.

A little way back the "key" says "there is no Mortal Mind," and consequently "no transference of mortal thought." If there is no *Mortal Mind*, there could be *no mental state*, then how can she ascribe the effect of a prescription to a particular *mental state?*

" These (mental) states are not comprehended, and they are left without explanation except in Christian Science. The rule and its perfection of operation never vary in Science. If you fail to succeed in any case, it is because you have not demonstrated the life of Christ, Truth, more in your own life —because you have not obeyed the rule and proved the Principle of Divine Science." Yes, but what of the " mental state? " It seems to me that must be largely controlled by matter

"A physician of the old school remarked with great gravity: ' We know that Mind affects the Body somewhat, and advise our patients to be hopeful and cheerful and to take as little medicine as possible; but Mind can never cure organic difficulties.' The logic is lame and facts contradict it. The author has cured what is termed organic disease as readily as she has cured purely functional disease, and with no power but the Divine Mind." I must say for that medical brother, that he was a " cracker-jack."

His advice was good for any one. Now, let us see, in the last statement she admits, there was a matter *physician*, that had *a mind*, and had *announced* that *patients* had *existed* somewhere and they had *Minds*, and that he had advised them to be *cheerful*. This statement is an admission that they could be cheerful, and that is an existence; and so on through all of the material relationship she continues to make such statements and admissions, but at the end she knocks the whole thing in the head and denies all that she has stated and admitted.

" ' But mind can never cure organic difficulties.' The logic is lame, and facts contradict it. The author has cured what is termed organic disease as readily as she has cured purely functional disease, and with no power but the Divine Mind." That leads to this question: Was the *author a divine Mind?* That is what she says in this statement. I do not know whether that is what she meant or not. I am not in *telepathic rapport with her at this time* and am not in position to advise. ¶ She says in the last quotation that she has cured what is termed organic disease as readily as she has cured purely

functional disease, and with no power but Divine Mind. That either means that *she had a divine Mind* when she was doing the " curing " or else it means that in some way she *directed divine Mind and had it do it.*

If Mrs. Eddy could direct divine Mind and have it cure organic disease, she must have been *superior* to divine Mind, for I submit that it takes a *stronger power* than divine Mind to *control* and *direct* it, and have it *do* such a thing as *cure disease* ☙ ☙

What do you think of her assumption, when she says, " I cured,"—" The author has cured? "—*That statement shows that she was possessed of the same animalistic tendencies, the same human selfishness, the same desire for aggrandizement that marks the existence of any human being.* What lack of information Mrs. Eddy shows when she says she has cured organic disease as readily as purely functional disease; as if such a thing as purely functional disease were possible. This shows her to have been possessed of the same limited Mind that we all have, and *shows that anything that she ever succeeded in doing was done because of that wonderful power that radiated through her material body, giving her animation* ☙

Again, on page 152: "Anatomy describes muscular action as produced by Mind in one instance and not in another. Such errors beset every material theory, in which one statement contradicts another over and over again." It is absolutely impossible to find in any anatomy, a statement of that kind relative to the control of the muscles.

No " *Scientist* " has ever found such a statement in anatomy. You will find statements that may be construed that way in therapeutic physiologies, but with the many egregious errors of " standard " text books on anatomy, they make no such statement as that.

" It is related that Sir Humphry Davy once apparently cured a case of paralysis by introducing a thermometer into the patient's mouth. This he did merely to ascertain the temperature of the patient's body; but the sick man supposed this ceremony was intended to heal him, and he recovered accordingly." Doubtless when Sir Humphry Davy pushed that

patient's head back to insert the thermometer, he accidently adjusted some cervical vertebræ that were occluding nerves, and thereby relieved the paralysis.

" The author's medical researches and experiments had prepared her thought for the metaphysics of Christian Science. Every material (note the admission) dependence had failed her in her search for truth; and she can now understand why, and she can see the means by which mortals are divinely driven to a spiritual source for health and happiness." All of us know that material dependence would fail us in a search for truth. We all know that we have to take hold of this power that is being transmitted to us from the Soul in order that we shall acquire truth, and that we take hold of it through this same Mortal Mind, that she says does not exist; that same Mortal Mind that she says is an " erroneous thought," the same *Mortal Mind* that must reach out and advise us of all that we know, and *outside of which there is absolutely nothing that we can know.*

Now it would seem very strange to me that an individual should spend the length of time, the amount of thought, the tremendous effort that this woman spent in the preparation of this " Key," and then *permit it to go to the world such a consummate ambassador of ignorance and misrepresentation.* ¶ In this connection it must be remembered that by this book this woman raised herself from the very depths of poverty to the very pinnacle of wealth and position. You must remember that this woman, through the influence of this book, filled her coffers with hundreds of thousands of dollars. You must admit that this woman by the use of this book came to be known in every country of the civilized world. You must know that this woman, through this book, produced such an influence as to have her book translated into substantially every civilized tongue, and to have had it distributed widely over the earth much like the Christian Bible.

You can understand that there was a most definite and consummately selfish reason for the writing of this book; an ambition as selfish and strong as ever animated any individual in life, and in these things *you will find the explanation for*

this conglomeration of error and contradiction. It rises no higher than that and I can give it no higher place.

In closing my remarks in regard to this phase of the subject I desire to say that I *defy any Human being to find one paragraph in* "Science and Health, With Key to the Scriptures" that is *all truth*, or to find one paragraph in it that is *all untrue*. I defy any Human being to find *five* Human beings, who will *fairly investigate it*, that will *agree* as to what is said in any *one paragraph*, or to find *one paragraph* that does not, either contain *contradictions* or else *contradicts some other paragraph;* permitting me to cross-examine.

Now, for the lesson. Laying aside all momentary contentions, we find, that all of these religions of healing, in ancient and modern times, have been efficacious, not even excluding medicine, the proud boast of which is, that it is not a religion.

Each system of healing has required for its efficacy, a belief, on the part of the individual, in a higher power than himself; not necessarily a belief in God, as we accept that term, but nevertheless, a belief in *power not possessed* by himself, if it was not more than a *belief in his doctor*, or in the curative powers of a drug.

So we find that *faith* on the part of the subject is absolutely essential to *all healers*, whether ancient or modern. All of them, in order that they shall succeed, require that the individual shall have *faith;* that he shall believe in his *Mind;* in his *Body* in all of *its parts;* Christian Science, as well as the rest. ¶ The very highest development that any Christian Scientist acquires, or can ever acquire is absolute *faith* in his own *being*. ¶ In passing I must say for Christian Science, that it has filled a niche in evolution, superior to that of any other *error* that has ever been taught; because it has *unshackled the Minds* of Human beings from *dogma and written record*, and has turned attention to an investigation of *Mind;* the *human attributes*, and to *tracing them through the Soul, to the God of the Universe.*

Each system of healing requires *works;* requires not only faith, but works; a doing *that which is believed, in order that what is desired may be accomplished.*

Now, my friends, think with me for just a moment in passivity at the close. Let your Minds go back through the entire course of lectures. Draw to yourselves for a moment the thoughts that have been expressed. Conceive what has been declared to be Psychology, the Science of the Soul. Again, think of your Mind. Think of that channel; *Mind—Soul—Great Soul.* Think where we begin functioning.

Think whence we immediately receive power to function. Think whence that power is immediately derived.

Remember that we begin accumulating intelligence in the Mind, from Soul relationship—then Great Soul relationship. Understand that all there is of a human being came through this channel. And you will see, that all these different religions of healing, simply tend to one great, common center, and are all comprehended in what we call Modern Psychology.

LECTURE NO. 8.
JUNE 20, 1913

Psychology and Health

MY FRIENDS: We have come to the most important lesson of the entire series.

We are peculiarly interested, usually in the discussion of what we have been led to believe is mysterious, and interest is likely to flag when we come to the application of what has been considered mysterious to what is considered commonplace.

You will notice that our audience this morning is not quite so large, and the reason for that is, we have finished, the analysis of all that was supposed to be mysterious; and it was generally known that this lecture would deal with the application of the truths we have brought forward, to the human body, a subject incorrectly thought to be very dull and uninteresting.

It would be of little avail, indeed, to know all that we have reviewed if, at the end we should stop without making application of it to our use and benefit.

The lessons so far have developed, that it is possible for us to know the source of health and strength. They have also developed that we may know how to apply that knowledge. As to these propositions, let me

RECAPITULATE

We have learned that the Great Soul is the reservoir of all intelligence and power.

We have learned that the Soul of man is the specific and immediate reservoir of intelligence and power to us.

We have also learned that the radiation of that intelligent power from that immediate reservoir, the Soul, to our bodies, through the medium of brain and nerves, properly referred

to as the nerve system, and scientifically designated, organized channels, causes all animation, incorrectly conceived to be life, a word, which considered in its proper significance and relationship means health, for without the thought of health we cannot get a full conception of life.

We have learned that the condition of each cell of the body, so long as the nerves related to it are sufficiently unobstructed, is continually being conveyed to the Soul.

We have learned that all experiences of tissue elements, or cells, are immediately impressed to the Soul side exactly as they occur; and all such information, that goes with the command that it shall be, is evolved into consciousness as soon as possible.

We have learned that all other information respecting the body, as to its condition and relationship, that is not commanded or requested to evolve, is retained by the Soul, except that which is necessary for immediate and general body advices.

Transmission of this kind radiated from the Soul forms the basis of sensations, such as fatigue, uneasiness, lack of passivity to a distressful degree; nervousness, which is the same thing—the lack of passivity; moodiness, which we have learned to charge to glandular inactivity; melancholia, which is assigned to the liver; destructiveness, which we charge to anomalous formation impinging nerves.

These are common sensations, and these, because of immediate necessity are constantly being crowded forward by the Soul, and in a way thrust above the threshold of our consciousness, so we are in constant recognition of them; but this would not be true if it were not for the fact that they are necessary for our advice, in order that we may preserve our body machine.

Aside from these, there is the vast reservoir of retained information, that we have received, when unconscious of it; such as we might receive through our open, though sleeping eyes, looking toward the partly curtained window of a sleeping car, receiving a kaleidoscopic impression of the scenery through which we are passing.

Usually we are never conscious of that vast store of information, because the Soul is not impressed, at the time of receiving it, that it is, or will be, of any value, and, therefore, never evolves it into our consciousness; but nevertheless, it retains that information always.

The myriad of things that we see when we gaze upon the landscape that are indelibly fixed upon the Soul, and yet of which we are never conscious, furnish other illustrations by which we can form some idea of the vast lore that the Soul holds, that it does not give over to us.

When we look at the landscape, we are impressed with the picture as of a oneness—however, we see and are made conscious of but a very few things in that picture. Much that we have unconsciously received through sight, if it should become valuable to us will be evolved into our Minds. But much the vaster amount of such impression will remain in that great reservoir, the Soul, wholly unused by us.

What has been said of sight applies, as fully, to all other means of acquiring information, which fact brings us to understand, *how meager is our Mind information, compared with that of our Soul*, even from the material aspect, to say nothing of that from the Soul side.

Information such as indicated, conveyed by the Soul to that part of Mind prepared for that office, constitutes the *seat of tissue sense*, whereas information that becomes a part of our *memory, constitutes the seat of conscious sense.*

It will be fully realized, by those that think carefully about it, that the department of tissue sense is very extensive compared with that of conscious sense, and that both are very important factors in our subject this morning:

PSYCHOLOGY AND HEALTH

In considering the subject of this lecture we find that the basic proposition is, that *suggestion has power to control sensation and indeed, the functions and operations of the physical body.*

In other words, that intelligence applied to the human organism through that all inclusive term—suggestion—may influ-

ence the Soul to radiate its energy through the Body in such way as to cause health.

The thought that, suggestion has power to remove obstruction to transmission of this formative, intelligent energy, is not new by any means. It is a belief that has obtained, at all places and in all times of the world's history. All that is new about it is its *immediate understanding*, *recognition* and *specific* and *intelligent use*.

I need only refer, in the beginning, to the belief of the ancients in all forms of mysterious removal of disease. This, in its last analysis, is nothing more than a belief in suggestion, for it makes no difference whether the belief is fixed upon the Medicine Man, his formulae, and mysterious actions, or whether it is the belief that some sacrifice will appease some God, and therefore, remove abnormality. These are not different. They are the same, and are the removal of disease as the result of suggestion.

Suggestion was in general use in what is called civilized communities, before the introduction of medicine. I refer to healing among the Greeks, Romans, etc.; to their manipulation; their fastings, their prayers, their anointings with oil and perfumes, their bathings, washings, etc., all according to rote, and all for the purpose of maintaining or restoring their health, and each of those methods was calculated to secure the effect of suggestion in their bodies.

Suggestion has always been the basis of the practice of medicine. Its entire twenty-four hundred years, proves this fact. I need only pause, to refer to the inculcation into the minds of its votaries that there are curative properties in medicine.

The belief, that there is curative value in medicine, was so generally and so forcibly impressed upon the Minds of the human family during the first six hundred years of the use of medicine that the following eighteen hundred years—though failure has marked the entire pathway—has not served to banish that faith.

Today most of us here, if not all of us, have adopted means, aside from medicine, for our restoration, and yet nearly all of us occasionally, in moments of weakness, find ourselves

dominated by the old faith in medicine. This, of course, is transient and we soon throw it off; but it is sufficient to reveal to us the tremendous hold, that faith in medicine has upon the human family.

This is not strange, when we remember that faith in medicine has clung to our ancestors, as a religion, for hundreds of years, and has come to each of us with our mother's nourishment, and is therefore a part of the very warp and woof of our being.

When this phase of the power of suggestion is examined under this searchlight of intimacy, we can easily understand, that it will require the best part of our lives to fully eradicate this belief in medicine.

I speak from experience. I have devoted thirty years to the eradication of any faith in medicine, and yet, in moments of weakness, I sometimes catch my mind reverting to that chimera of my childhood. ¶ We are all prone to hark back in moments, when off guard, to the faith of our childhood and to things as we then believed them to be.

To illustrate how prone we are to go back to original suggestion. I was in the bath room this morning getting ready to shave, and the thought occurred to me that I would need a light. I immediately retired to the kitchen, got a match, came back and reached up to the electric fixture, to light the lamp. I had harked back to my boyhood and the old wall kerosene lamp of my mother's kitchen.

Thus you will feel yourself reverting to the old suggestion received in childhood that there is curative property in medicine, but after thirty years of careful investigation of this subject, aided by the most enlightened minds of the world, I declare that there is no curative property in any medicine, aside from its influence as larvation to a suggestion.

The same phases of suggestion form the basis of magnetic healing. It is believed that some sort of magnetic fluid escapes from the body of the operator and enters the body of the subject and drives disease from it, and there are many people who believe that fallacy today, simply because of the larvation to that suggestion,

You say, "How are you going to know when you have eradicated fromy our memory false suggestion? How are you going to know that you have given to the Soul a sufficiently powerful command that it shall no longer convey information that has been impressed upon it?" You must give to the Soul a *sufficiently powerful and continuous stream of suggestion to obscure and render negative that which was there before.*

When I told you of being restored from the tobacco habit, I meant to have you understand that when the hypnotist gave me the suggestion, while in the passive mode of mind, that he and I together had secured, he did not remove that habit; but he did transmit through my mind to my soul, a sufficiently powerful suggestion with command of continuous evolvment that when I revert to the subject of tobacco, the *first thought that comes is that I do not like it; that I loathe it with all my nature, whereas; before there was in that part of my Mind, the thought that I liked tobacco and that I had to have it.*

¶ What I said of magnetic healing, is true of all manipulative systems. I speak especially of vibration, massage, Swedish movement, osteopathy, mechano-therapy, and all methods of that character.

All such systems are based upon manipulation, and to these I shall add electricity, which, after all, is only vibration, and hydro-therapy, which either produces relaxation or constriction, and so in a circumscribed sense these are nothing but manipulation. And last of these, the modern system, called psycho-therapy, which, of course, is manipulation procured through suggestion.

Suggestion is the basis of Christian Science, which I referred to in the preceding lecture. *It consists peculiarly in the belief that God is all that exists;* that, therefore, *human beings do not exist,* and of course, *cannot suffer pain. It will be seen that this is the most potent suggestion, although the most untrue, that could be given to a human being.*

Psycho-therapy is a mixture of terms. The name was intended to express the thought—the therapeutics of the Soul. That thought, however, is so strained as to be meaningless.

The Soul is not material, therefore, there could be no such

thing as the therapeutics of the Soul. But, let us consider the proposition as broadly as possible, from the standpoint of those that named it and brought it to notice.

The psycho-therapeutic idea is that by means of suggestion, properly applied, it is possible to remove all phases of abnormality. This exact method came into existence about the year 1894.

The method had been practised, in a sort of sporadic and indefinite way for some years prior; but in 1903 Thompson J. Hudson published his remarkable book, "Mental Medicine," in which he systematized the tenets of the suggestionists and gave to the method its name.

In this connection it must be remembered that Hudson developed this theme quite extensively in "The Law of Psychic Phenomena."

Since that time several large schools have been developed, in which psycho-therapy is taught exclusively, or at least those conducting the schools think so.

I need only pause to say that each system or method has done much good, because they all contain a certain amount of truth, and no system that has *any part of truth* for its basis will fail to accomplish *some favorable results*.

All systems or methods are true, in as far as they correctly include the law of suggestion; and *in ratio as each has secured the free and untrammeled operation of suggestion, has it succeeded and been of value?*

Each system or method has done harm. Some of them very much. *All systems and methods injure the human family, just to the extent that they are untrue.* It will be seen that the ratio of injury is different as applied to each of them, but *each is responsible for a certain amount of harm.*

No system that teaches, what is not true, can escape the responsibility of having done injury to the extent of that untruth. It is this fact, that should prompt us to a careful scrutiny of any system or method, that we contemplate applying to our bodies, for we must remember that, in the application of any system, or method, *there is either benefit or injury.* And the *benefits* and *injuries* respectively, will

always be in ratio with the truth or error involved. ¶ Let me caution you that, we should be very careful what we teach. We have had some view of the permanency and power of suggestion; let us remember, when we teach, that we are using the power of suggestion, and that if we are *suggesting the truth* we are *evolving those that hear*. But if we *are suggesting that which is not true*, we are *devolving those that hear*. Let us remember also that in every action we are suggesting to the extent of our influence.

Now, let us observe the scope and power of suggestive-therapeutics, or to leave off that meaningless word therapeutics, let us see the scope and value of suggestion as a restorative agent.

You will understand that the basic law relied upon is that, *the Soul is always amenable to control by suggestion, except under well and clearly defined circumstances.*

Within the scope of its applicability, *suggestion is the most valuable agent, because it brings to aid, that intelligent and formative energy, that causes animation of our bodies in the first instance*, and, *therefore, causes us to possess health and strength* ☙ ☙

In connection with what has just been said, it must be remembered that the Soul is only amenable to-suggestion, when the brain and nerves are in a sufficiently normal condition, to cause sufficient Mind function to be able to receive and transmit a suggestion.

In other words, suggestion is only possible when the *physical avenue is in such condition, that intelligence can be conveyed through it, to the Soul and transmitted from the Soul to the body.*

¶ We should understand that suggestion, is in itself, of no value at all, and only becomes valuable when there is sufficient intelligence to receive and transmit it.

You will observe that I include both conscious and tissue sense, as brain functions. I do this because there are certain phases of suggestion, transmitted through the brain, with which Mind, as generally understood, has nothing to do, and knows nothing about.

I refer to suggestion, accomplished through the department I

have named—tissue sense—such suggestion, as disturbs the sleep of the individual when heart nerves are occluded, of which Mind can have no knowledge, because the heart is not supplied with sensory nerves.

It clearly appears that, a suggestion will be of no value, if it can only be received and *transmitted to the Soul;* but can not be impressed by the *Soul upon the Mind*, as valuable memory, *or upon the seat of tissue sense in the brain, and thence through the nerves to any part of the Body.*

For fear the last phase of transmission may not be readily grasped, let me illustrate: An individual who is paralyzed has a Mind and nerve system, sufficiently normal, to receive and transmit a suggestion to his soul, and yet part of his nerve system is in such abnormal condition, that the suggestion cannot be conveyed to the paralyzed part of his body, hence it is beyond aid, by means of suggestion.

What has just been said is a criticism of all psychologists that have written down to my time; for they have all united in saying that the Soul, or what they usually refer to as the subjective, subliminal, subconscious, or some other kind of a sub-Mind, is *always* amenable to control by suggestion.

The Soul is only amenable to control by suggestion when the machinery of intelligence of the organism is in such condition that it can *receive and transmit the suggestion to the Soul;* not only that, but when the *machinery of intelligence and transmission is in such condition that it can receive a suggestion from the Soul and carry its influence into operation in any, or every, part of the body.*

In the ability of the Soul to reach every part of the body, through the machinery of intelligence and transmission, lies the wonderful power and efficacy of suggestion, for the correction of abnormality.

It will be seen that, when the machinery of intelligence and transmission, cannot convey the suggestion from the Soul to a particular part of the body, that part of the body is beyond aid, through the means of suggestion.

This is the important point that has escaped observation of psychologists and so-called psycho-therapeutists. If Dr.

Hudson had realized this truth, he would not have made use of his stock phrase, " Oh, the psychic will fix that all right! " and would have bestirred himself to an intelligent correction of his Body by extraneous means, and if he had done that, in all probability, he would not have died a young man, just at the point of his greatest usefulness, but would still be with us —hale, hearty and valuable.

Let us consider this matter just a little farther. I have referred to suggestion from the Soul, being radiated through the machinery of intelligence, to avoid fixing upon *Mind* as the agent, or referring to the *brain indiscriminately*, as so many have done.

I have made these statements preparing the way to forcefully present the fact, *that there is a department in the brain like in function, except for consciousness to Mind, produced to care for a multitude of transmissions* that we would call sensation, if we were conscious of them, but since we are not, I have called them—tissue sense.

The existence of a seat of tissue sense in the brain may seem difficult of demonstration, because of the newness of the conception; but the demonstration of its existence will be found easy, if we consider our experiences with our own organism ❧ ❧

For example we know that blood and lymph continually move in the proper channels of our bodies, *but we are wholly unconscious of any sensation therefrom.*

The glandular excretions take place according to fixed law and yet no *sensations arise therefrom.*

The wonderful process of absorption, which is the taking into our body, the elements for its sustenance, all done without our having knowledge of it.

The immaculate function—assimilation—which is the elaboration of chemicals, and their molecular arrangement in such manner as to become animate, under the force of nerve stimulus acting unobstructedly; *without Mind being involved in the transaction, or our having any consciousness of it.*

We never become conscious of any function through the medium of sensation, so long as the function remains normal.

¶ We do not have knowledge of abnormal function through the medium of sensation; but the *failure* of performance extends the adverse effect so widely that the seat of conscious sensation is reached, and we are apprised of the situation, and have applied to it the general term—disease or not-ease ☙ I am sure that no argument beyond this simple statement, will be required to make it perfectly clear that these functions cannot be performed without conduct that is in some respects, similar to sensation. Indeed, without conduct that would be called sensation, if it were not for the fact that we are never conscious of it; *but in the normal condition the consummate of all such action is to produce the passive and sweet sense of existence* ☙ ☙

We are all cognizant of the facts stated in the foregoing paragraph, but many have never thought about it. Yet, we all rely upon the truth therein stated and make application, to ourselves and others, of those facts.

We all understand, for example, that physical contact always produces two effects. That is to say, there is the *conscious effect* of the contact and there is also the *unconscious effect*, that acts upon the individual as a *subtle suggestion*, that many times he will fail to understand as being in any manner related to physical contact.

The intuitive understanding of what we have called tissue sense is made beautifully apparent in the desire of nearly every woman who has been a mother, to get hold of the feet of a baby.

Women do that for two reasons, both of which are based upon intuition. First—the contact acts as a suggestion, *influencing her maternal nature;* and, Second—she does it to bring her *motherness into such relation as to influence the child.*

Mothers do not have to be philosophers to take advantage of these facts—all they need to do is to follow their intuitive impulse, or the universal law, revealed through the processes of deduction.

How genuinely we all rely upon the cool hand placed upon the fevered brow—the calm steady hand of the unexcited—to still the one that is overwrought. Not many of us are con-

scious, that when we attempt, by touch, to secure passivity in others, we are going with help to the channel of tissue sense and through it transmitting beneficial suggestion.

Another beautiful illustration of our recognition of the fact of the seat of tissue sense is seen in accidents. An individual falls and is unconscious. Those that first arrive to assist will, without any instruction, after having secured air and room, proceed to chafe the wrists and stroke the brow and body; at least to some extent.

When you think about it, *this could have no influence upon the consciousness of the individual, except through tissue sense centers in the brain*, reaching the Soul as a suggestion that it shall again arouse the person.

What has just been said is also true of fainting, which is the nearest approach to, and most closely simulates, death of any condition a person presents. The individual in such condition may be wholly unconscious, nevertheless, almost any bystander will throw water on the face or manipulate the body, and does so without any mental understanding of what he is trying to do.

Here, again, the appeal is being sent *through the seat of tissue sense to the Soul prompting it, demanding of it, that it shall return and revivify its royal palace.*

If those performing the manipulation in a case of fainting, were asked to explain their actions, they would respond that it was for the purpose of shocking the patient and starting the circulation.

This answer, to the majority, would be so wholly satisfying as to leave nothing further to be asked, or desired. And yet such an answer is wholly meaningless and is but the babbling of the outside, material man, expressing in its fullness physical limitation ❧ ❧

In such cases as those I have been reverting to; we wholly overlook the fact that we are acting intuitively, or in other words, under formative guidance, for the purpose of securing that harmonious relationship necessary to animation and are *suggesting to the Soul that it send its kenetic energy, through the brain and nerves of the stricken person, causing consciousness*

and all functions and operations that appertain to the normal. ¶ The thoughts presented, relative to the various methods, are sufficient for this occasion. They apply to us. They should lead us into a recognition of all truth.

Sufficient has been said for us to know and realize, this one far reaching fact, that if we expect to get well or keep well, *we must keep the channels open, through which shall be transmitted to us that wonderful intelligent energy, that in the beginning, fashioned our Bodies, and which since that time, has maintained them in the degree of vigor and power which they have manifested.* We should understand that we must not permit anything to obstruct the transmission of that intelligent power.

Our next inquiry is, what is this intelligent, creative energy transmitted through? The answer is that it is transmitted through the brain and nerve system. It is not only transmitted through the brain and nerve system, but having been transmitted through the brain and nerve system to the most infinitesimal ends of the nerves, it is then radiated in some remarkable manner that is not well understood, for a distance beyond the ends of the nerves through which it was transmitted ☙ ☙

Nerve stimulus having been radiated in the manner described, causes the elaboration of the wonderful formulas that, are resolved into so-called animate, or living cells, which by relation produce tissue and finally the whole organism ☙ It is necessary to understand, what constitutes an obstruction of this intelligent energy, and in this connection, let me interpolate, that by the term, obstruction—occlusion, as referred to the transmission of stimulus, it is not meant that such an interference necessarily stops the radiation of the energy, or turns it back, for this it can well be understood, is impossible. ¶ Kenetic—Soul—energy, will not be prevented from radiating by occlusion, but when thus interfered with, will be partly or wholly deflected from its channels, the nerves, in which event it ceases to be stimulus and *becomes a destructive, instead of a constructive force.*

Therefore, occlusion of kenetic energy, exists when there is such

tissue displacement, whether molecular, cellular, segmental or organic as to change the character, consistence, place or relation of nerve elements, to such an extent, as to interfere with transmission of stimulus through them.

Observe, that when what has just been described as occlusion, of kenetic energy—usually called nerve stimulus—takes place, functional abnormality must immediately ensue, beginning with the nerves involved and following with the tissue elements immediately around their periphery.

No functional abnormality could exist without disrelation producing occlusion. And in many cases, disrelation that substantially deflects kenetic energy—stimulus—from its channels, and prevents the transmission of the influence of a suggestion that has been impressed upon the Soul, to the abnormal tissue of the Body needing correction.

In such a contingency, it plainly appears that the limit of the influence of suggestion, as a healing agent, has been passed, and the elements, cells, tissues or organs, so situated are beyond the reach and power of suggestion, because the avenue through which suggestion must be conveyed is obstructed—occluded—and transmission can not be accomplished.

In event of occlusion sufficiently grave to prevent transmission of the influence of a suggestion to the part needing it, what must be done? Are we so situated that in such an extremity we must calmly stand by and watch the part thus affected or the organism, as the case may be, die because the nerves, the channels of transmission, are occluded as the result of displacement?

I am glad to inform you, in answer to the question, that it is possible to *replace and relate all displaced parts, removing occlusion, so that formative energy can be normally transmitted, causing normal chemical consistence to take place, resulting in normal tissue and function.*

The question will be propounded—if all abnormal function is caused by occlusion of kenetic energy—nerve stimulus—and such occlusion is always produced by disrelation; may disrelation ever be removed by suggestion? And the answer is—yes; *but only in certain cases.*

Disrelation may be removed by suggestion only *so long as the organism is capable of transmitting suggestion to the Soul and conveying the influence of suggestion from the Soul to the organism and to each and every part of it.* Any part of the organism that cannot be thus reached, is beyond help by suggestion. ¶ *Many individuals treated psycho-therapeutically, and by the system called Christian Science, have died untimely, because they failed to realize this important and far-reaching truth* ❧

It will require no further discussion to show, that when disrelation of sufficient gravity to substantially occlude radiation of Soul energy to a given part, has occurred, it will be *impossible to replace that part by means of suggestion, and that the time has arrived for extraneous physical aid, intelligently applied* ❧ ❧

To cling to the thought of removing disrelation of this gravity, by suggestion, is as ridiculous as it would be for an individual to attempt to right his house that has been racked by storm without the use of physical means externally applied. The parts of the house are all there, but they must be related properly by skillful manipulation of a builder ❧

The parts of the house are in the same helpless situation, from the standpoint of a house, as the parts of an organism that are so gravely disrelated as to be occluded from the influence of suggestion. *Each must have extraneous aid.*

It is not hard to understand that force which, acting through its normal channels is constructive, is destructive when it is deflected from its normal channels.

One may easily understand, that in order to act constructively upon molecules or atoms, energy must be transmitted to, and reach them in a *certain manner.* And that energy reaching them in a *different manner* must necessarily produce a *different* result. *And in this different result lies the distinction between normal and abnormal function in tissue production* ❧

It is somewhat strange, that the facts just stated have not at all times been fully known and appreciated, for at the time of *dissolution of each individual, we have the illustration of disrelation and occlusion beyond the power of suggestion to reach and remove.*

If the last statement were not true, *dissolution would never take place*, for no human being ever reached and passed into those processes, *without the expense, in his behalf, of a multitude of suggestions for the prolongation* of his life, including his *most profound auto-suggestion.*

I say no individual advisedly, for it is impossible that an individual could be without relatives or friends, and the suggestion of relatives and friends is always that the individual shall live, and of course, his own suggestion is always that he shall live.

In this connection, it will be remembered that telepathic suggestion is just as efficacious as that of those nearby ☙ The death of each individual, therefore, is proof of the limitation of suggestion in the correction of physical abnormality. Death is also proof of the limitation of all physical means to secure replacement of disrelated parts.

In all cases, in which adjusting has been intelligently attempted and has failed to secure correct relationship, dissolution may serve to furnish a *comparison* of the value of *suggestion alone* and *suggestion aided and abetted by intelligent physical assistance.*

Since these things are true, it is essential that, as intelligent beings, we shall adopt such measures as will not only *take advantage of the power of suggestion to the fullest extent*, but to add to that method, a system of physical assistance *adapted to its every principle and harmonious with its every law. That system should consist in a wise, judicious and careful method of adjusting all disrelated parts.*

That system of adjusting must be based upon *such a comprehensive and intimate knowledge of the construction of the human organism*, and the *relationship of its parts*, as to enable us to know when any segment has departed *ever so slightly* from its *relationship*, and also to know when any part has lost its *normal chemical consistence*, which is always incident to its relationship. When we have acquired that knowledge we must then learn to *replace the parts and to secure normal relationship—normal chemical consistence.* In other words, we must learn to know occlusion and its effect at a

glance and must learn to remove all occlusion at once upon its occurrence, in order that radiation of kenetic energy—nerve stimulus—shall not be disturbed.

I desire to say that in 1895 the first steps in this direction were taken and the first adjusting, by specific intention, was performed. Other adjusting followed upon the first, and a system has been improvised.

That system has been added to, developed and expanded until it is no longer a simple system of adjusting, but is incident to a *science so comprehensive as to substantially include all others*. The name Chiropractic has been given to this Science and System of Adjusting.

The Science of Chiropractic includes all of the principles of suggestion; it teaches adjusting of the physical into harmonious relation with Soul force, and it is therefore, the link of union between unseen force and seen material, the Soul and the Body.

Such a wonderful thing has never been accomplished before and, therefore, Chiropractic stands today, the peerless leader of all systems directed to the removal of abnormality, and in the application of its principles will come the eventual evolution of human beings, to such perfection, as to eliminate functional abnormality, except as the result of occasional traumatic injury.

¶ My friends, it is glorious beyond comprehension to have lived in the period of the last six years, while this wonderful science of Chiropractic has been fructifying in the Minds of a few human beings and by a tremendous consecration and effort, has been brought forth, its truths classified, systematized and reduced to tangible form in permanent record; so that it may be disseminated to the teeming millions of the world to bless and uplift them and to evolve posterity, so long as life shall exist on this planet.

It is my hope that you will come into a full understanding of all the things that I have stated, for I have stated truths that are destined to revolutionize society and evolve the human family ☙ ☙

At no distant day Chiropractic will be recognized, as teaching the universal relationship of Body to Soul, and the application

of these eternal principles, and will be adopted in all countries of the world, and very much of the sickness, sorrow and despair now incident to human living, will by its wonderful efficacy, have passed away from the human family and we shall generally have such joy of health and strength as has never before been known.

Part Two

Biology

Including Bio-Anatomy

CHAPTER NO. 9

General Discussion of Biology

BIOLOGY is that branch of discussion of phenomena which deals with the action of life, through and upon matter, causing animation.

Too frequently, heretofore, Biology has been conceived to be a discussion of life, or of living things.

All things indigenous to the earth, are in themselves inanimate, and only take on the conduct of animation when they are impelled in a specific way by the force of life.

Things that move in the conduct, that we call animation are not alive, but life is imminent in such structures, but not inherent in them.

Biology is, therefore, not a discussion of life, *per se*, but is a discussion of the formation, and maintenance of structures ordinarily, although erroneously considered to be alive.

From our material viewpoint, all that is possible for us to know of life is what we can learn by experience, from its manifestation in material forms about us.

Nothing seems more clearly settled, than the fact that life is in no sense material, nor an expression, or emanation from material ☙ ☙

We have just learned from the department of Psychology herein, that so far as our conceptions or possible knowledge, confined to our being is concerned, life and Soul might well be conceived to be interchangeable terms.

That is, life is a causative factor in the production of the human organism, in the place we have already assigned to the Soul.

In this connection it should be stated, that we ascribe to the Soul, qualities or attributes, which are not necessarily inherent in the abstract thought of life; but immediately

become so, when we recur to the continuous conduct, incident to the expression of life.

The Soul, is unquestionably the cause of the formation of our material being, it brings together the inanimate particles of matter and weaves them into the warp and woof of our material organisms, and causes all of the conduct that takes place, from all of which we can not isolate a conception of life.

¶ To those not familiar with the phase of thought now being presented, there appears to be a difficulty in the statement that the Soul causes all animation, in that they, at once raise the question, do lower animals and members of the vegetable world have Souls?

In order to avoid dogmatic confusion, which a direct answer to the question propounded might involve, it is suggested that no one knows, because no one is in position to obtain information by experience, the only method by which any one knows aught of the Soul.

However, the matter is rendered very simple, in that we are unable to separate in our conceptions, life from Soul, the answer then is, lower animals and members of the vegetable world may not have Souls; but life is immanent in them, and from the standpoint of organisms, life is in every sense analogous to Soul.

In the phase of the subject just stated, it may be seen that life, by use of its intelligence, or the Soul intelligence which maintains it, causes every animate structure, that ever has or ever will exist.

Biology then as a discussion of the manifestations of life, addresses itself first to the causation of every animate structure, and second to the conduct of every structure.

Biology, must be considered under two grand sub-divisions: 1—*What has been called the animal kingdom:* 2—*What has been called the vegetable kingdom.* It will be seen that this language might be simplified under the terms animal animation and vegetable animation.

That department referred to as the animal kingdom, is assigned to Zoology, while that department referred to as the vegetable kingdom, is assigned to Botany.

In the department of Zoology, all phases of animal animation is considered, and some writers have announced that this department takes us from the amœba to man.

However comprehensive Zoology may be, its first and most important consideration reverts to the subject of anatomy. Anatomy consists of the formation, size, shape, color, relation, and description, of the parts of an organism. It therefore treats of the structure of members of the animal world. ¶ Botany consists of the formation, size, color, relation, and description of the parts of plants, and includes every form of animation aside from the animal kingdom.

The next step in Biology, is a consideration, and description of the conduct of, either the parts of a structure incident to an organ, or the whole organ; which when confined to animal animation is called Physiology.

Of course the conduct of structural parts, under animating force, in the vegetable world, is not more nor less than Physiology yet it has not been generally so classified.

In connection with the subject of Biology, two other classifications are usually considered. They are Etiology, and distribution ☙ ☙

Etiology, has already been thoroughly considered in this work under the department of Psychology.

Distribution, will be discussed under physical laws in this department, and will therefore, not have further attention here ☙ ☙

From what has been said, it will be seen that Biology; is after all only the link of connection, between unseen force and matter; or is a description of the action of the force of life upon matter in such way as to construct given forms, and cause conduct as different as are those forms.

In a certain circumscribed sense, Biology connects Psychology with Physiology, through the medium of what we call anatomic structure.

CHAPTER 10

Physical Laws—Relative to Distribution

IN a consideration of the human machine, there are two departments of force that must always be considered in relation with each other: one—the force of life, which will be considered hereafter, and two—universal force relative to the human organism, which it is the express purpose of this chapter to detail.

The general law of force that must always be considered by the student of Chiropractic is simple and not difficult to understand, provided that certain basic facts are always kept in mind. These are:

1. At or near the surface of our earth all matter if not sustained by other substances goes in a straight line toward the center of the earth. This phenomenon has been called "gravitation;" the force being called "attraction." These words are meaningless from the standpoint of an explanation, but give sufficient name to the universal operation that we may so designate it.

If the support is taken away from under a body and nothing disturbs the operation of attraction, the line which it will follow in its fall will be the vertical or perpendicular. The transverse of such a line is called horizontal, although it is not a curved line such as is the horizon. This novelty is introduced arbitrarily in order to secure exactness of measurements

2. All matter is said to have ponderability or weight which only means that it responds to the law of gravitation. ¶ The standard of weight or ponderability and its comparisons are fixed at the general surface of the earth called "ocean level." ¶ Generally speaking, matter loses in ponderability as it is

raised above ocean level but this loss is incident to relative phenomena and not so far as is known, because of any intrinsic change in the matter itself, except that as it lessens in ponderability its relative pressures are not so great and it becomes more porous or distended as to its particles.

3. All particles of matter, whether considered generally or as parts of an organism, tend toward the center of the earth and if in contact, with no force to disturb, they stick together in ratio with their ponderability and with pressure universally applied to them, thus expressing a phenomenon that is called cohesion.

It will be seen that if the law of gravitation, that universally operates at or near the surface of the earth, continues from the surface in both directions, then cohesion of the particles of a body will be increased in ratio with the distance going toward the center of the earth and will be decreased in ratio with the distance going away from the surface of the earth. ¶ Since the scope of experiment in these directions has not exceeded five or six miles it is not known to what extent this law applies, but within the scope of demonstration it applies and that meets with the requirements of the student in the present work.

The law referred to furnishes a fundamental basis for the consideration of altitudes as applied to the subject of health, it being true that some human organisms function better in the higher altitudes, while others function better at ocean level or low altitudes.

For the purposes here, the student will remember that animal life and, so far as that is concerned, vegetable life can only exist in certain places on the earth and that these places are circumscribed and in the broadest concept of them, no matter how completely the globe is considered, such life only exists at or near the surface of the earth. ¶ In order not to be misunderstood, " at or near the surface of the earth" means, at the present time, substantially within the distance of six miles in either direction from ocean level. Most of the six miles from ocean level up has been demonstrated, but a considerable part of the six miles in the other

direction has not yet been tested. ¶ Within the scope from ocean level there are large areas of the earth's surface where life is not possible and still other larger areas where life is very difficult of maintenance. The reference is to the Arctic and Antarctic and desert regions and to great elevations. The effect of altitude on function is not, however, to be accounted for solely from the standpoint of a greater or lesser cohesion, at different altitudes, but in connection therewith, there must always be considered the chemistry of the atmosphere in the region under consideration.

4. The earth is surrounded by a gaseous vapor called atmosphere, which responds to the law of attraction and tends toward the center of the earth equally at all points.

Ocean level is the place of universal measurement of the gravitation of the atmosphere, which is said to be fifteen pounds to the square inch.

With no interfering force or chemical reaction disturbing the operation of the law just expressed, the atmosphere is said to have its greatest density at ocean level and to lessen in ratio with the distance vertically away from that point. ¶ The cohesion of the particles of an organism therefore at ocean level is increased by substantially fifteen pounds to the square inch of its supporting surface. This pressure would be lessened in ratio with the distance vertically away from that point.

It may be seen that in a great ascent from ocean level the divergent lines of gravitation would not only so completely overcome cohesion of the particles of an organism as to render animation impossible, but to lessen atmospheric pressure and so diverge its particles or its molecules as to render respiration of it impossible.

The operation of these laws upon human organisms, accounts for the bleeding through mucous membranes of catarrhal persons, or persons whose mucous membranes are non-resistant, as it is Chiropracticly expressed; or prostrations of those whose respiratory organs are non-resistant and the swooning of those whose brain tissues are abnormal. In other words, the operation of the law discloses a weakness in

cohesion in any part of the body incident to the abnormality of the cells of that part.

Other things being equal, therefore, it is hazardous for any person gravely abnormal, as to any of the organs of vital function, to attempt high altitudes. It would be equally hazardous to go to great depths within the earth for in that direction from ocean level the laws operate in the directly opposite; the resistance of abnormal organs being just as readily and disastrously overcome.

5. Cohesion in solids, the molecules of which are alike, or adhesion in liquids, the molecules of which are different, is because the molecular surfaces are fitted to each other and therefore cease to vibrate individually but vibrate together, thus establishing a harmony of conduct necessary to permit gravity and atmospheric pressure to hold them together. ¶ The surface of very refined substances, such for instance as plate glass, cohere when firmly pressed together sufficiently to sustain the weight of the glass. Numerous illustrations of the operation of this law with regard to inanimate substances might be given, such for instance as soft putty, clay or wax, the molecules of which may be pressed together so that they cohere perfectly. Welding two pieces of metal of the same kind is another illustration. The commonest and perhaps the most complete example of adhesion is the facility with which mud attaches itself to any other substance.

It must be recalled that it is in the organization of the molecule of solids to construct substances that are to be animate, that the operation of these laws present their most awesome aspects, for it must be remembered that cell growth can only be accomplished by the operation, primarily of adhesion in liquids and finally of cohesion in solids.

Incidentally, it will be seen that the exact relation of molecular surfaces within the distance of the law of cohesion must be caused by the force of life acting upon the molecules, in movement and that when, responding to that force, a given molecule has been related to another so that it coheres; its vibration has, by this means been unified with that of the molecule to which it coheres. This produces what is called

tenacity and is functionally referred to as resistance a-
It gives much scope, to the thought of the intelligence behind animating force, when it is understood that organisms, from the beginning, are produced as an entirety by the operation of cohesion and that final dissolution, as it is called, which should scientifically be termed disintegration, is but the lack of cohesion because of the withdrawn or occluded force of life.

6. In the preceding paragraph it is stated that primarily the law of adhesion operates, followed by cohesion, because the substance out of which the organism, as to its solid parts, is constructed, is a liquid and it must be conceived that the molecules of the liquid are not alike and only become alike by the homogeneousness produced by the elaboration that must occur, in the instant of cohesion.

It will, therefore, be understood that the molecules of a colloid out of which the animate body is to be constructed cling to each other by the law of adhesion, and that the force of adhesion must be overcome by the force of life in order to impel such molecular impact as to put in force the law of cohesion, and then cause the cohered molecules to continue to vibrate according to the law of the organism.

CHAPTER NO. 11

Morphology—Vegetable—Animal

AS has been indicated in a preceding chapter Morphology, is divided for our consideration, into two departments: A, the animal; B, the vegetable.

Morphology, refers to structure and comprehends every phase of form, shape and relation, that is presented in animal and vegetable animation.

Form, shape and relation of structure, is distinctly in the department of Histology, and will be discussed under that head in the next chapter.

For the present consideration, Morphology will be discussed as to those phases of the subject which may be said to more particularly precede its detailed discussion.

The substances that compose vegetables and animals are now conceived to be in, four forms, gas, liquid, colloid, and solid.

¶ To settle and give definition to these four forms of matter; GAS is an invisible fluid, that does not have definite form and that does not have definite volume. A definition such as the one just given, does not carry the mind far toward detail, and therefore some illustration will not be amiss at this place. The earth is surrounded by gas, which is said to be somewhere between fifty and two hundred miles in thickness, and is what we call atmosphere. Air is a composition of invisible gases that envelopes the earth. The word air is usually supposed to be interchangeable with the word atmosphere, but it is not. Air is that portion of atmosphere only, in which animation can be maintained.

The reason that gas is described as not having definite form is because its particles change their relation so readily. It is impossible to conceive that gas has not volume, and yet we are prone to think of gases as having the quality of being

rare, and of being dense, and of changing from the one to the other insensibly, and therefore we do not think of gas as having definite volume.

An extended and detailed study of gas is an essential preparation for a full comprehension of Histology.

Liquids are a compound of gases, sufficiently more stable than fluid gases to have definite volume, but to change their form readily and are therefore said to have indefinite form but definite volume. Liquids are said to be composed of globular elements that roll upon each other with great readiness, these respond to gravity generally and to all phases of force incidentally. Liquids have such regularity of volume and ponderability as to be easily capable of being measured and weighed. Because of the readiness with which the globules of liquids change their relation and respond to the impulsion of force, this substance is the medium for the admixture of all other forms of matter.

It will not be difficult for the student to realize at this juncture, the tremendous importance of a definite and practicable understanding of liquids.

Colloid, is a form of liquid which may be classified as jelly. Colloids, are substances composed of liquids and solids associated in such a peculiar way that the solid elements tend to maintain a definite relationship to liquid globules, thus producing the consistence that has been called jellylike. In order that a colloid may be produced, the solids immersed in the liquid must be reduced to such small size that they are said to have wholly lost ponderability and to present nothing but surfaces and tend to retain definite relation with liquid globules by means of surface attraction.

It will be observed that a colloid, as described, is the link between liquids on the one hand and solids upon the other.

¶ The student should understand that his entire knowledge of tissue construction, growth, reproduction, physiology, maintenance, pathology, and finally dissolution must depend upon his understanding of colloids.

A Solid is a substance or a part of matter, which has definite volume and a definite form which it constantly tends to

maintain with specific resistance, which it requires a certain amount of force to overcome.

It will be observed that the principal difference between a solid and a colloid is that the particles of matter in the liquid to form a solid are not so small as to have lost ponderability.

¶ In the vegetable kingdom we may state all that is necessary here, in very few words, for it is not the intention to go into the details of analogous physiology of plant life.

There is no essential morphologic difference, so far as it has yet been possible to ascertain, between the animal and vegetable kingdoms. The essentials are practically the same. The student is requested to give the matter consideration from this standpoint:

A—Plants have structure not essentially different from that of animals.

B—The basis of plant structure is a cell just as it is in animal structure.

C—Plants grow and reach maturity.

D—Plants have systems of nutrition.

E—Plants have systems of assimilation.

F—Plants have systems of depuration or elimination.

G—Plants have systems of reproduction or procreation.

¶ The student will observe from the foregoing that the principal distinctions that occur between animals and plants, is with regard to the systems of nutrition, elimination and locomotion, so far as structure is concerned.

We are prone to feel, since we are a part of the animal kingdom, that there is a superiority in the animal structure over that of vegetable, especially that portion of the animal kingdom called Man. However, so far we have been unable to put a finger on the difference from the standpoint of structure.

It would seem possible to establish a well defined line of demarcation between the vegetable and animal departments of animation, however, when the attempt is made it is found that certain structures can not be definitely assigned to either department.

Plants grow by a gestative procedure but animals do also,

so in this respect there is not necessarily much difference. Animals that present definitely the ability of locomotion, however, have well defined systems of digestion and in this respect demonstrate a marked difference from plants, which have no digestive systems definitely as such at all.

Upon animals of definite locomotive ability distribution has its most marked effects, such animals respond to the influence of climate, atmospheric conditions and elevation and seek those best adapted to them.

In the preceding chapter, the laws affecting distribution have been stated so that subject need not be followed further here, however it might be added that to secure the best conditions of plant and animal animation the greatest care must be given to securing the most advantageous place, considered from ocean level and from atmospheric chemistry and temperature and moisture.

The student is encouraged to read widely upon the subject of distribution and its effects upon animal organisms, especially, but incidentally upon plants.

CHAPTER NO. 12

Histology

LIFE, as it is observed in this material existence is but the action of matter under the operation of force.

It is of the utmost importance to the student that he familiarize himself, at least with the more usual conduct of matter under the application of force in the *abstract*, in order that he may make adaptation, so far as the subject permits, as to the phases of the application of force, in the *concrete*, to inanimate particles of material in the production of animation.

In this view of the phenomena it will be observed that matter is never, under any circumstance alive, but is only animated and impelled to the performance of its various offices by the application of the force of life acting through, upon, or with relation to it, causing the co-ordinance and co-operation of its parts, in all of the wonderful and multifold movements which have so universally, but incorrectly, been denominated living matter

That life is, or exerts, force, is one of the commonest phenomena and for that very reason the consciousness of that fact is only had in the occasional instance, when it should be of common recognition.

Few, if any, have failed to observe in the sprouting of seeds or the coming up of small plan s how frequently large portions of earth are lifted, cracked and thrown back to permit the escape of the top of the plant to freedom above the ground. Who has not stood with awe and observed this phenomenon in the sprouting and growth of the delicate radish or turnip? These delicate plants would be crushed by any other attempt to force their tops through the soil, but by the gentle and continuous application of life force they slowly penetrate their way to the sunshine and air above the surface.

Many persons have seen a solid rock riven by the growth of a tree in one of its crevices and yet it is only the occasional individual, witnessing such demonstrations, that thinks far enough to understand, that these are but the expressions of the force of life.

The matter contained in the vegetation of these illustrations is not alive, but is animated by the force of life acting through it ☙ ☙

These thoughts are referred to for the sole purpose of inducing the student to understand, that a comprehensive knowledge of the functioning of the human machine is necessary, in order that he may be active to the thoughts, with respect to the various operations of that machine, that will be discussed in this book.

The human organism presents a varying degree of heat and this is ordinarily called its temperature.

The heat of the body is caused by the operation of the force of life upon the molecules of the liquids and gases of the organism. When this force acts unobstructedly it converts the adhesion of liquids and gases without undue friction into the cohesion of the molecules of the organized solids and continues the molecular vibration of those solids in uniformity ☙ ☙

If the application of the force of life is interfered with, vibration of the molecules is so changed and the molecular relation so interfered with, as to greatly increase friction which greatly increases heat.

It must not be overlooked, in this connection, that as the vibrations of the molecules are coarsened, in organized solids, the spaces between them become greater and are occupied by liquids and gases.

The liquids and gases accumulating in such conditions are composed of negative formulae, and after a time the spaces become so great, that molecular friction is reduced, until a condition called heat minus in the organism is produced ☙

Some help may be given the student in this connection when his attention is called to the fact, that not only does the law referred to operate as stated, but the chemistry of the area or

organism under consideration greatly influences the operation of the law, that is, the chemicals of substances respond differently to changed vibrations.

Certain chemical compositions, under the same vibration, express a greater friction and therefore a higher degree of heat than others. An illustration of this fact is found, by comparing for instance the 21st and 22nd days of July in the temperate region. Let us suppose that both are clear days. The sun shines brilliantly, there is no wind. The 21st is extremely hot, the 22nd is cool and delightful. The difference in heat is because of the difference in the chemical formula of the atmosphere in the area under consideration.

It would be pleasing to follow this theme further but sufficient has been said for a foundation for the histologic statements about to be made.

Histology is the first and primary subdivision of anatomy.

Histology is a study of those parts of structure that are generally classified as being microscopic in size, or even much smaller. However, only those parts have been discussed that the microscope will disclose. It is held to be a description of the details of the units of structure.

It will be seen that histology, therefore, deals with the animal cell, which is presumed to be a unit of animal structure. A little thought will make it plain, that a cell can not be the unit of structure for the cell is composed of parts, which are described.

The unit of structure may only be conceived, by the process of deduction, and must be the smallest part of matter that can exist.

At present there is no name for the actual unit of structure, the *ion*, being the smallest isolation that has received a name. ¶ For the purpose of our present discussion, however, the animal cell will answer the purpose, if while the student is using that term, he keeps in mind that it is not the unit, and in each instance makes deduction to the actual unit of structure.

In order to understand the breadth of histology, the student must see that the body consists of many characters of

tissue, such as muscle, ligament, bone, etc., and that histology gives a description of the basic arrangement of cells of each of these.

It must be understood that so far as physiology and anatomy go, each cell is derived from a parent cell; but the truth is that behind all that, a cell must originally be formed by the arrangement of particles of matter under the domination of an individual, intelligent force, which must continually act upon and through the matter, giving to it all of its powers of movement, nutrition, and reproduction.

Not only must this be true as to the animal cell, but it must also be true of its immediate successors, as well as those of the completed organism.

The brain and nerves of the original cell, for the impregnated ovum, must possess the elements from which the brain and nerves are finally fully developed, as well as the elements from which every other tissue of the body is derived. These are too minute for observation or isolation, yet their presence in such a cell can not be doubted.

It can no more be doubted that creative and sustaining energy continues to act through the elemental brain and nerve system of such cell, causing the processes of motion, nutrition, segmentation and gemmation, which finally result in the completed organism, with its matured brain and nerve system, through which stimulus acts, in such a way, as to be easily demonstrable, upon all of the organs that have been and are to be described, through which the same forming and maintaining stimulus continues to act until the instant of dissolution.

The animal cell is a soft, gelatinous granular material, enclosed in a membrane containing a vesicle filled with a colloid, inside of which there are one or more spots of denser material. It is microscopic in size and differs much in different kinds of animals.

In the refined organisms, among which the human is classified as being superior, the two essential elements of a cell are: (1) *Protoplasm*, which is the soft, gelatinous, granular material; (2) the *nucleus*, which is a small spherical vesicle,

imbedded in the protoplasm, containing inside of it the denser spot called the *nucleolus*, or if more than one, the *nucleoli*. It is supposed that many cells exist without the nucleolus. Since the cell is microscopic in size this may or may not be true, and in non-reproductive cells there is no need nor occasion for a nucleus or for nucleoli.

Protoplasm is a proteid which can not be distinguished from albumen. It is, speaking from the standpoint of tissue, the lowest form of organized matter. It is insoluble in water, and coagulates at 130 degrees Fahrenheit.

The protoplasmic cell seems to have the inherent power of motion and nutrition.

By motion is meant the changes in its shape which enables it to thrust out from its body an irregular process into which the whole of its substance is gradually drawn, so that the mass occupies a new position. This has been termed amœboid movement. It also has a ciliary, or hair-like, vibratory movement ☙ ☙

Nutrition is the process of bringing into the cell, by means of absorption, the materials for its maintenance and growth from surrounding matter. It will be observed that this is but another mode of motion.

The nucleus is a small vesicle imbedded in the protoplasm, usually of spheroid form and in size, proportioned to the protoplasm. It is regarded as a portion of the protoplasmic substance set apart for the purposes of reproduction. It is of a little different chemical consistence than the ordinary cell protoplasm.

It is known that the process of reproduction, so far as it has been observed, commences in the nucleus, and is accomplished by two methods, called *segmentation* and *gemmation*.

Segmentation is that process by which the nucleus and the whole of the cell separates into two parts by first becoming constricted in its center, assuming an hour-glass shape, which finally results in the separation of the whole cell into two new cells, each of which contains some of all of the parts of the original cell.

The student by a little thought will understand that tissue

formation begins with the smallest part of matter conceivable, which for the present we may call an *ion;* and that ions are related and cohered to produce an atom, and then atoms are related and cohered to produce a molecule and that finally molecules, are related and cohered to produce a cell.

Each time the animal cell is thought of, the mind should also go to the ultimate of conception, stated in the preceding paragraph ☙ ☙

Cohesion has been discussed in Chapter Ten, so that it need not be discussed here.

It will be observed that the various tissues of the body are formed by the relation and cohesion of cells which have been produced in the manner already described.

The different forms and characters of tissue are produced by the different chemical formulae composing the cells entering into the formation, and the different shape, size, and relation thereof.

The different formulae, of chemical consistence, of course, refer to the molecule, atom, ion, and smaller fragments of matter if such exist and enter into the fundamental basis of cells ☙ ☙

It is not the object of the present work to produce an anatomy; therefore, the arrangements of cells to produce each character of tissue will not be given, the purpose here being merely to lay the proper foundation for that work in the student's mind.

For the purpose of aiding the student in understanding physiology, a few general statements as to tissue construction will suffice.

As a basic proposition all tissue is connective. This statement applies to glandular and brain tissue, as fully as to muscle, ligament, or membrane. All glands, the brain and other very soft tissues are held together by spicula, or strips of membrane, so arranged as to be called a net work or trabaculae. The components of a tissue are always so arranged as to provide for easy occupation, within them, of nerves, arteries, veins, capillaries, lymph spaces and vessels.

By the arrangement indicated, nerve stimulus is transmitted and applied to tissue elements; blood is carried to capillaries, through the winking valves of the walls of which its plasma is extruded to furnish the substance for tissue building and maintenance; veins to carry the remenant blood on, and finally back to the heart, receiving on the way lymph from various sources; lymph spaces, in which elaboration of substances for assimilation is performed, and in which depuration is commenced, and lymph vessels which carry residuary lymph and depuratory substances to surfaces of the body, or to depuratory tubes, or back into the veins.

All of the so-called deep tissues of the body, are by the arrangement just outlined, and through the channels indicated, in direct connection with eliminating surfaces, or depuratory tubes of tissue.

Depuratory surfaces are always composed of epithelia. The epithelial surfaces are the skin, the membrane lining tubes of the body which are exposed to the air called mucous; and that lining tubes, vesicles and cavities not exposed to the air called serous membrane. These surfaces are rich in eliminating tubular orifices.

An epithelium is composed of a basement membrane which of course, is composed of a dense network of small, closely placed cells, upon which membrance is placed a layer, or more than one layer, of cells.

The cells of an epithelium are joined together by a cellular cement, by their edges, sides, or ends, depending upon the character and purpose of the structure.

Epithelia occurs in two general classifications, 1. Simple epithelium and 2. Stratified epithelium. A simple epithelium consists of one layer of cells upon a basement membrane. A stratified epithelium consists of two or more layers of cells upon a basement membrane.

Epithelia are classified according to the shape of their cells into tassellated or pavement, columnar, spheroidal or glandular, and ciliated. The pavement is composed of flat cells varying in size. The columnar or cylindrical is formed of rod-shaped cells which sometimes present a different shape as to

their ends, called goblet or chalice cells. ¶ In spheroidal or glandular epithelium the cells are circular or polyhedral in outline ☙ ☙

Ciliated epithelium may occur on cells of any of the preceding forms of cells, but usually is found on the columnar. That which distinguishes it is the presence of minute processes that are hair-like prolongations of cell protoplasm extending from a basic cell. These are constantly in a lashing motion like waving grass.

An epithelium upon the inner surfaces of closed cavities, such as synovial, the heart, blood and lymph vessels, surfaces of the brain, vertebral cord, etc., is called *endothelium*, because it is within the cavity and not upon something in a stricter sense.

Ciliated epithelium lines the respiratory tract; the middle ear and Eustachian tubes; the Fallopian tubes and upper part of the uterus; the first part of the excretory duct of the testes; the ventricles of the brain; and the central canal of the vertebral cord.

The layers of cells are not only attached together in stratified epithelium, but the cells in any epithelium are attached by their edges, ends or sides, by a cellular cement, except at such places as the winking valves of the capillaries and other places where membranes are constructed to have fluids or liquids pass through them.

CHAPTER NO. 13

Bio-Anatomy

THE student of anatomy is confronted with two remarkable phases of growth or development.

The first of these consists of the wondrous phenomena attendant upon the evolvement into human cognizance; or the arrangement of substances into such forms, as to be possible of recognition from the thought of organized existence or anatomic structure.

I shall call this Bio-Anatomy and shall discuss it sufficiently for present needs in this chapter.

The second deals with that phenomena subsequent to an organic form, that is to say, subsequent to such structural arrangement as brings it within the scope of discoverable parts and clearly within the term—Embryology.

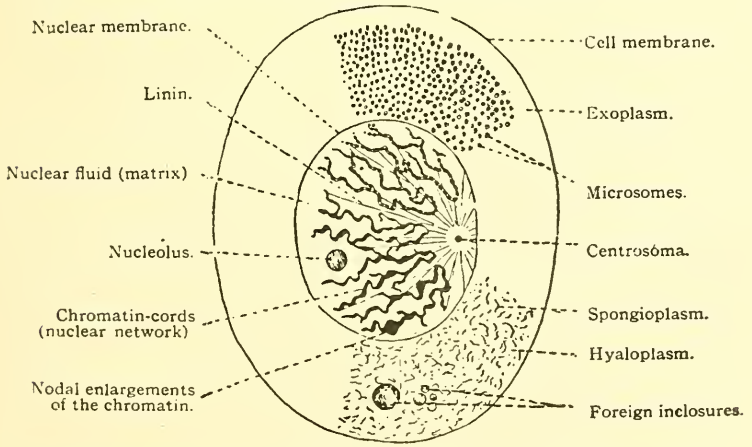


FIG. 1—ANIMAL CELL

The black line, on the outside, indicates the limiting membrane. The circle on the inside indicates the limiting membrane of the nucleus, which is the germinal spot. With these suggestions the student will easily detect the other elements.

The student should at this point make sure that he has carefully familiarized himself with the animal cell and with all the details of its structure, for consideration of the subject now to be presented requires an intimate knowledge of the details of the animal cell.

The student will recall that the animal cell is said to possess a limiting membrane—a cell body—a nucleus—and a nucleolus, or sometimes more than one—called nucleoli and that these cells are classified as being non-reproductive and reproductive. Tissues contain many cells that are without the office of reproduction, but remain an integral part of structure, their molecules that are classified as being worn out—disintegrating—while their places are being constantly taken by new molecules. This molecular interchange constituting what should properly be called cellular maintenance.

¶Reproductive cells are very much more numerous than those discussed and are necessary, in the first instance, to the growth of a structure, for it will be clearly seen that cells that are incapable of division into new cells, are by that limitation only able to maintain structure in its original size and would preclude the possibility of growth.

Reproductive cells are also necessary for the recovery of a wounded part, even in adult life, where tissues have been torn or cut away, the correction is only possible because new cells are produced. This is also true of fractures, lacerations, contusions, etc.

The student of inquiring mind will at once ask the question, if an animal cell is the unit of tissue—what are its parts composed of? This is a legitimate inquiry and one that should not be lightly passed over as it has been the habit of authors on this subject to do.

As has elsewhere been said, an animal cell is just as perfectly composed of distinct forms and related parts as is a tissue, and we should understand that the reason these more infinitesimal, but equally important parts of a cell are not discussed, is that our machinery of investigation does not reveal them ☙ ☙

Want of machinery should not prevent us from understand-

ing that such parts of cells actually exist and are of just as high development and as perfect relationship as any of the structures with which we are familiar.

Following the thought presented in the preceding paragraph —deductively—we eventually arrive at the place where we must juggle with imagination, as the materialists have done, by introducing the novelty—as though it were a necessity—that matter can not be divided out of existence, but can be divided indefinitely; or else we must reach the point where we conceive the original formation of entified or organized matter, to be related by and in conformity with the force of life.

Just at the point reached in the preceding paragraph, so-called scientists have permitted themselves to become greatly agitated and to wander from the field of the real and palpable in their efforts to carry out materialistic theories with regard to the production of what has been called animal life.

Every animate substance in the entire realm of nature gives unimpeachable proof, that what we call living substance is not more than inanimate molecules, the relation of which is caused by a given energy to produce a new and different form of conduct, which conduct we call living. Substances so organized and energized we classify as being animated ☙ In the abstract, the fact of animate substances consisting only in form and relationship of inanimate particles, formed and related according to the law of a given energy, only occurs to the student as being strange, because of the newness of the thought and not because of a possibility of its inaccuracy ☙ Upon a little reflection it will be seen that the statement is based upon the truth universally accepted even by the crassest materialists, for they uniformly teach growth, and growth of an animate organism would be an absolute impossibility but for the law I have just stated.

If an animal were composed of living tissue, it would have to be produced full grown, for it is unthinkable to conceive that life can grow, and just as much so that a living tissue might grow, or reproduce.

It will be easily seen that for an organism to grow from the

weight of ten pounds to two hundred pounds will require the introduction of one hundred and ninety pounds of inanimate matter in the way of food, water, etc., substances taken from the environment.

The substances taken in must, by the various processes of the organism, in what are classified as growth or development, be slowly and systematically brought within and under the control of the individual energy that constructed and maintained that ten pound organism, producing it as individual and distinct from all others.

If what I have just announced is not a law, then the phenomena I have just suggested would be impossible of accomplishment ❧ ❧

A short excursion at this point into the realm of animate things, with the thought of the preceding paragraphs in mind will furnish the student with an overwhelming accumulation of data, which he will find proves the universality of application of the law just stated.

The evidence obtainable proves that, as to this particular phase, all animate things come into existence, grow and mature in the same general manner.

If an organism increases from ten pounds in weight to two hundred, by the law of relation of elements under the domination of a given energy and the whole is individualized by that energy, then it is perfectly legitimate to conclude that, that organism grew from our earliest recognition of it to the weight of ten pounds by the operation of the same law and by the same individualizing energy.

If the organism grew from its earliest existence, in conformity with that same energy, and if these deductions are true and they are most fully established by the entire congeries of phenomena from our earliest knowledge of an organism to its fullest development, then we must take the next step and understand that the organism begins its individual existence where the gametes that compose it are separated into their consisting particles and are re-arranged and related to constitute a separate animate entity.

Having arrived at this point which embryologists have dis-

cussed under the head of the impregnated ovum, I must pause to take up the essential steps that immediately precede this wondrous transaction, in order that I may complete in the succeeding chapter that explanation.

The steps of production of animate things have herein been sufficiently discussed.

It should be clear to the student, at this time, that animal structures are not alive, but are just animated particles of matter, which without the animating force of life would be nothing more than inert matter.

CHAPTER NO. 14

Forming of Zygote

TO fully understand this chapter the student must have a very accurate knowledge of human anatomy, and it would be better if he was proficient in comparative anatomy

The student should at this juncture turn to the chapters on the procreative organs of the male and female and examine the anatomy of them, being sure to fix upon the mind with great care the details of the tubules of the testes and the Graafian follicles of the ovary, for without a clear understanding of these he can go no farther.

By such review he will learn that from the epithelial cells of the lining membrane of the tubules of the testes there bud off certain cells which at a certain stage of maturity loosen from the nest cells and float free in the seminal fluid and are called spermatozoa.

The student will also find that from the cells of the epithelial lining of the Graafian follicles of the ovary there bud off certain cells, that at a certain maturity float free in the follicular fluid and are called ova.

It will be seen that at this stage a spermatozoon and an ovum simply present to us, animate animal cells, with peculiar characteristics living, however, each according to the law of the individual energy of the organism in which it is produced.

¶ The production of these cells presents a phenomenon not different from that of lymph corpuscles and blood corpuscles, for in lymph and blood these animate cells float free in liquid, but perform conduct in harmony with the individual energy animating the organism in which they are.

It is one of the most remarkable facts of nature, that the spermatozoon and ovum, arise to animation in organisms of

which they form no tissue part. These cells taken separately have but one destiny, and that is to become inanimate. Spermatozoa and ova only enter into tissue formation through the processes of impregnation. If they do not meet with the experience of impregnation, their destiny is that of lymph and blood corpuscles.

Through the various channels described in the anatomy of the procreative organs, the follicular fluid carrying an ovum and the seminal fluid carrying a spermatozoon meet in the organism of the female in what has been called the process of impregnation ❧ ❧

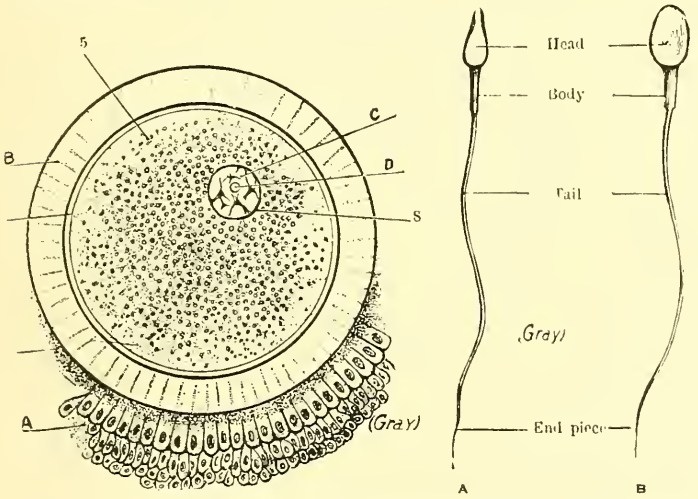


Fig. 2—Schema of Ovum and Spermatozoon
Ovum—A, Corona Radiata; B, Zona pellucida; C, Nucleus, or germinal vessel; D, containing a nucleolus.
Spermatozoon—A, side view; B, front view.

The process of impregnation is here briefly to be described. The ripe ovum descends into the vagina through the os uteri where it meets the spermatozoon. This is not always the process, but is the normal one, the meeting may occur at any place from the vaginal orifice to the Graafian follicle.

The spermatozoon pierces the limiting membrane of the ovum and so much of it as is essential to procreation passes

within the ovum, while the remainder, separating, disintegrates. The membrane of the ovum closes behind the part that entered, and the process of impregnation is fairly on its way.

From the instant of the entrance of the spermatozoon into the ovum, marked and characteristic changes take place in its germinal part as well as in that of the male germinal part. These immediately begin conduct wholly distinct and different from that so far performed. The elements of the ovum approach the spermatozoon in what is known as the

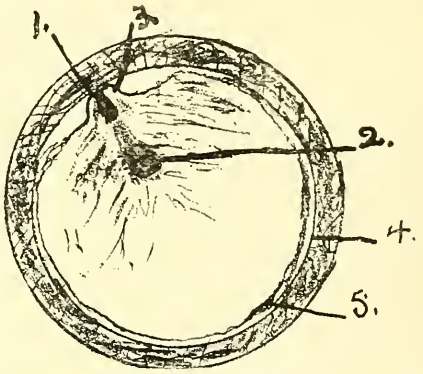


Fig. 3—Schema Illustrating "Cone of Attraction." It Indicates a Transverse Section of Impregnated Ovum

1, Male Element; 2, Female Element; 3, Cone of Attraction, Cytoplasm apparently inviting the spermatozoon; 4, Oolemma of Ovum; 5, Limiting Membrane of Cytoplasm.

cone of attraction, as though welcoming its entrance and attempting to make safe and easy its path of movement. The germinal elements from being concentrated separate into their particles, and the general cytoplasm of the ovum, as it is called, begins to be organized with relation to what are now called the male pro-nucleus and the female pro-nucleus, and as this arrangement takes place the gametes or pro-nuclei travel toward each other.

By the time they come near to each other certain elements of each stand out separately and coming nearer these separate, individual particles merge and fuse as it were into each other, producing a clear field in which nothing appears, finally after a period of seeming quiescence, granu-

lation occurs at a point between the places occupied by the gametes when they disappeared.

The granulated point is the beginning of the new person, and is called the *Zygote* or pre-embryo, the production of which completes the period of impregnation.

It will be seen that where the gametes, floating in their fluids, differ from lymph corpuscles, for example, is at the entrance of the spermatozoon into the ovum. Up to that moment their life history and conduct present nothing different from that of lymph corpuscles.

The gametes have been acting in conformity with the energy animating the male and female organisms in which they were produced.

Upon impregnation all is changed, they cease to thus act and begin to act according to the law of a new energy and in such manner as to produce a new organism composed primarily of the material brought from the parents in the gametes ☙ ☙

The temptation to enter the realm of speculation as to what this new energy is, that manifests itself at this juncture, will be repressed for it has not yet been given to human beings to know.

With regard to animating force it is sufficient, at this time to say, that it is an intelligent energy, that fashions the organism, and maintains it to the instant of dissolution ☙

These cells, the spermatozoon and ovum being reproductive, are of course from their beginning produced for no other purpose than that which they fulfill.

The gametes are, therefore, never a part of tissue, where they are produced, any more than the blossom is part of a tree.

These cells are constructed by the aggregation and relation of elements under the energy dominating the particular organism and are as completely an original formation as any organized substance could be conceived to be.

It will be observed that in this chapter I have not only explained the process of original formation, but that of growth and development, and have also given the exact

basis for hereditary tissue form, relation, and general tendency; indeed all that can be included in the general subject of heredity.

This chapter has been given in simple, descriptive terminology, for the purpose of preparing the student for the necessary technical statements that will be given in the next

CHAPTER NO. 15

Embryology to Embryo

THE spermatozoon and ovum supported in their fluids meet, it is believed, at or near the external os of the uterus ❧ ❧

The spermatozoon enters the ovum by penetrating its membranous wall. In this manner what is called the head and body passes within the ovum while the remainder is cast off.

At the time the spermatozoon pierces the membrane of the ovum, the inner substance called cytoplasm passes outward to meet the entering spermatozoon in what is called the cone of attraction. From this point the method of the approach of these prime parts and their fusion has been described. A marked peculiarity of the spermatozoon and the ovum as distinct animal cells is that they are not possessed of any independent reproduction.

As distinctive cells they are non-reproductive. They are,

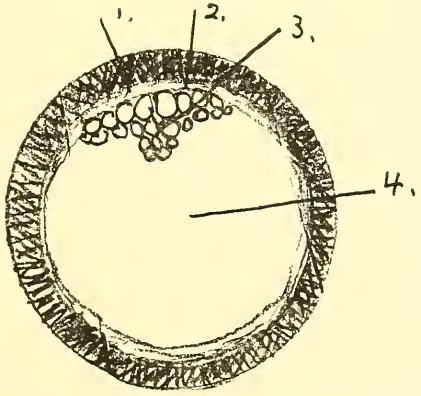


FIG. 4—SCHEMA ILLUSTRATING MORULA. TRANSVERSE SECTION OF OVUM
1, Oolemma; 2, Limiting Membrane of Ovum; 3, Morula, or segmentation of original cells; 4, General Cytoplasm of Ovum.

therefore, incapable of either segmentation or gemmation; but when they have fused in the process of impregnation, all of the various processes of cell-reproduction that are found in the adult body are manifested.

The most prominent of these is that of segmentation, but the subject is treated by embryologists as if segmentation was the only process of cell production at this period. After fusion of the germinal elements, there seems to be a period of quiescence which, of course, is only the completion of fusion. This period is followed by great activity in the production of cells, which seem to be massed together and are called a *morula*. The morula soon assumes such shape as to present a cavity within the mass of cells which is called the segmentation cavity.

The general cavity of the ovum, which is now a vessel, is called a *blastula*.

In forming the morula, the cells are arranged in two layers with respect to the membranous wall of the ovum, in relation to the original point of entrance of the spermatozoon. The outer layer is called the *ectoderm* and the inner layer is called the *entoderm*.

It will be noted that from the standpoint of an epithelium these constitute a stratified bi-laminar structure. By the completion of these layers of cells the blastula is converted into what is called the *blastodermic vessel*, and the further consideration of cell production will include the whole ovum. The cells of these two layers become differentiated as to shape and other characteristics, those that lie in the region of the entrance of the spermatozoon originally called the cone of attraction become columnar and form what is called the *embryonic area*.

The remainder of the cells of the ectoderm and entoderm remain flat cells and form the nutritive and protective structures which are later known as the placenta and fetal membranes ☙ ☙

The embryonic area, when examined, presents a somewhat circular dark outline on account of the thickened columnar cells. It soon becomes ovoid. The small end of the ovoid

area being that portion that is to become the part of the embryo away from the head.

Toward the head end of the ovoid area a still darker cell structure develops, which is the formation of the third layer of cells, that occurs between the other two, and is therefore termed the *mesoderm.*

At this time the cells of the ectoderm begin to thicken in an elongated row and extend down toward the entoderm upon which they finally rest in the form of a ridge. This, of course, is in the median line of the embryonic area and has received the name *primitive streak.*

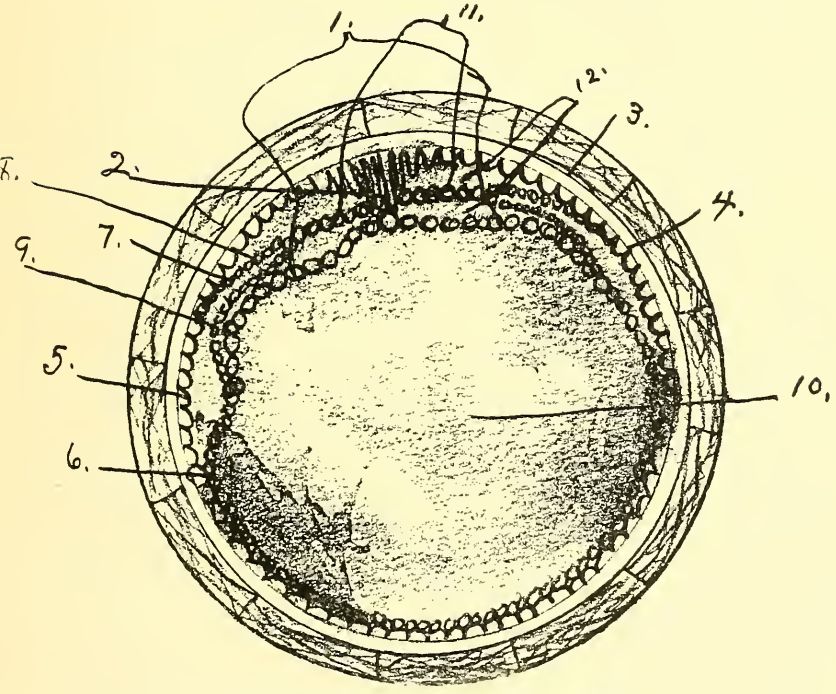


Fig. 5—Schema, Illustrating Transverse Section of Ovum

1, Embyronic Area; 2, Primitive Streak; 3, Oolemma; 4, Limiting Membrane of Cytoplasm; 5, Ectoderm; 6, Entoderm; 7, 8, Somatopleure; 9, Splanchnopleure; 10, General Blastodermic Cavity or Blastula; 11, Mesoderm; 12, Segmentation Cavity.

The student should observe that the primitive streak is many times longer than it is wide. Width only is illustrated in the cut. There are three layers in the embryonic region, the ectoderm, the entoderm and the mesoderm, a tri-laminar structure. The wall of the ovum inside and aside from the embryo has a quadri-laminar structure.

From the sides of the posterior extremity of the primitive streak or ectodermal ridge, cells grow out in a layer, or lamina which lies between the ectoderm and entoderm; finally covering the whole vessel of the ovum, except certain circumscribed areas, converting the bi-laminar, into a tri-laminar epithelium.

The student will note at this juncture that the mesoderm is an outgrowth sidewise from the ectoderm, and that the extension is between the ectoderm and the entoderm.

In this manner the blastodermic vessel grows. The embryonic area becomes pyriform and increases in length mostly in its caudal part, or part away from the head, in the region called the primitive streak.

Without going into the technical details, which are not necessary for the present needs, it will be sufficient to say that by a re-arrangement of cells, the brain, vertebral cord and general nerve trunks are now formed, and that around them the denser and grosser tissues, constituting the vertebral column and skull form.

The beginning steps in the construction of the nerve system is the production of what is called the cerebral vesicle, which soon by the changes in its shape forms what are called the three *cerebral vesicles.*

The several parts of the vesicle are called the fore, mid and hind brains. They are the primitive ventricles of the adult brain and vertebral cord.

At this juncture the student will observe three distinct areas in the enlarged ovum, now called the blastodermic vessel, the wall of which, is now composed of the ectoderm, the mesoderm, and the entoderm—tri-laminar blastodermic membrane. These three areas are the embryonic—the amniotic, and the placental.

The *Amnion* is that portion of the tri-laminar membrane, which extends from the margins of the embryo and separates into two parts, one of which turns back and completely invests the embryo, the two edges of it fusing together over its dorsum, to form the *true amnion.*

The other subdivision is called the *false amnion.* It con-

stitutes the outer layer of these two and extends out and completely invests the rest of the vitelline cavity, which the student will remember is that cavity enclosed by the wall of the ovum.

The student will notice that the primitive placenta with the remainder of the vitelline membrane, and the false amnion covering the rest of the wall of the blastodermic vessel, is called the *chorionic area*, and will understand that, in further reference to the chorionic area, it is to be considered as consisting of placental and non-placental portions ☙ ☙

The placental and non-placental areas must be carefully

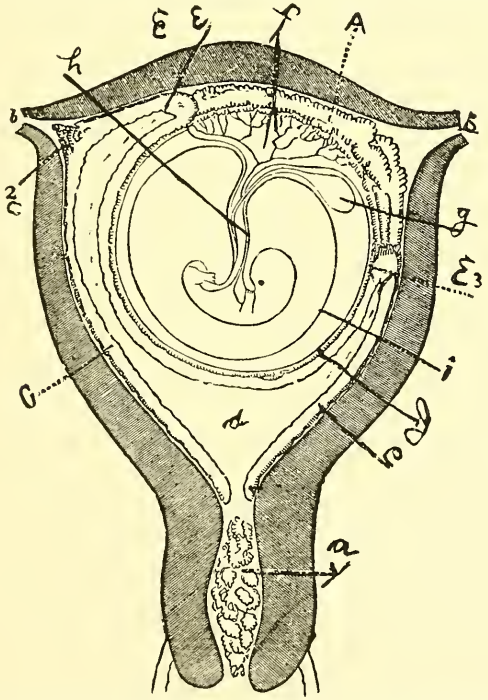


Fig. 6—Schema of Uterus Nearly Occupied by Developing Embryo Within the Ovum

a, Muco-gelatinous Plug in Os Uteri; bb, Fallopian Tube; d, Cavity of Uterus—Small part left outside of ovum; E3, E3, angles of Reflection of Decidua Vera; f, Decidua Serotina; g, Umbilical Vesicle; h, Allantois or body stock, Amnion; j, Chorion.

The student should note that the embryo in this illustration is almost completely folded off and floats in the amniotic liquid.

fixed in mind, for they become very important to an understanding of the subject in what is called "folding off of the embryo." That is, to a re-arrangement of the embryo at a certain time in its development, as to shape, size, and position, so that it becomes more distinct and the fetal membranes and placenta are quite distant from it.

The *Chorion* is a complex membrane made up of several parts, the original membrane of the ovum, that is, the vitelline membrane; the false amnion, just described, and a diverticulum from the splanchnopleure, called the allantois. The arrangement gives us this situation, the embryo is inclosed in what is called the true amnion, from which extends the false amnion, which in relation with the vitelline membrane and the allantois composes a complete outer investment which leaves a cavity between the true amnion and the chorion.

It is well, at this point, that the student caution himself that he is still considering the embryo as a flat tri-laminar structure and that the changes in that structure that are taking place are at first almost exclusively directed to its axis or the median line of the embryonic area. With this thought in mind he approaches the discussion of the *notochord*, which is the embryonic skeletal axis.

The notochord lies between the primitive neural canal and the primitive alimentary canal, in exactly the same position that the bodies of the vertebrae in the adult occupy between the neural canal and the general body cavity ❧ ❧

By certain developmental steps the notochord is converted into the vertebrae, intervertebral discs and skull, together with the meninges of the brain and vertebral cord.

Following the formation of the primitive axis, growth accomplishes the purpose of bringing the lateral margins of the embryo from their position, as a flat structure, together, below the axis of the embryonic area to enclose or construct the main body cavity, and in the accomplishment of this end, the tri-laminar structure is maintained.

As growth of the embryo advances, the middle layer, or

mesoderm, separates into two layers, so that from this time on, four layers are considered instead of three.

The outer layer of the mesoderm becomes attached to the ectoderm so that the two form one structure called the *somatopleure.*

The inner layer of the mesoderm becomes attached to the entoderm so as to form one structure called the *splanchnopleure* ☙ ☙

The student should here understand that, notwithstanding these formidable terms, the ectoderm and external layer of the mesoderm join together to form the wall of the body, generally referred to as the parietes, while the entoderm and the inner layer of the mesoderm together form the tissues that occupy the general cavity of the body, usually classified as the viscera.

It will be seen that this division of the mesoderm causes it to extend entirely around and compose the immediate wall of the *coelomic cavity,* when it is fully formed.

It will be remembered that on the somatic side, the mesoderm is in touch and connected with the ectoderm, while on the inner side of the cavity it is in touch and connected with the entoderm.

The student will understand that the formation of the coelom is around the outside of the remainder of the original blastodermic vessel, usually called the vitelline cavity, which it will be understood, is now surrounded by the entoderm.

That is to say, at this stage of formation the coelom is one part of the blastodermic vessel, now enclosed within the mesoderm of the embryo; while the remainder of that cavity is enclosed within the ectoderm, the vitelline cavity being within the coelomic cavity.

These several explanations bring us to the period that the embryo becomes definite, and therefore terminates the period properly called embryology.

In this chapter it has been sought to describe impregnation, fecundation, and the development up to that stage where the animate structure is definitely the embryo.

CHAPTER NO. 16

Embryo—Nutrition and Protection

AS introductory, the student, will recall that the human ovum is estimated as being one one-hundred and twenty-fifth of an inch in diameter and that its germinal part is estimated as being one five-hundredth of an inch in diameter.

It will be remembered that all of the substance of the ovum outside of the germinal vesicle is classified as the vitellus or yolk, and that the skin or outer membrane of the ovum is called the *oolemma*, which contains numerous foramina

After the entrance of the spermatozoon through the oolemma the ovum for a brief period of time floats in the follicular fluid in the uterus, receiving nutrition extraneously from that fluid and animation from its life source

The gametes or pronuclei within the ovum receive nutrition from the yolk granules of the cytoplasm and stimulus from the new individual source.

Upon coming in touch with the wall of the uterus the impregnated ovum adheres to it, and immediately, marked changes begin to take place in the mucous lining of the uterus

These changes are what would, ordinarily be called swelling with congestion, the mucous lining at the point of contact becomes thick, highly vascular and richly supplied with nerves

The ovum beds itself as it were, into the mucous membrane which soon swells out over it and entirely encloses the ovum within itself.

When embedding has been accomplished, three areas are apparent. The portion of the original mucous membrane

on which the ovum rests is called the *decidua basalis*, that immediately surrounding and that covering over the ovum—the *decidua capsularis*, and the remainder of the mucous wall of the uterus—the *decidua vera*.

These three areas in the order named represent the place of the primitive placenta, the region of the amnion or amniotic membrane, and the remainder of the chorion or chorionic membrane.

In order that the student shall not here become confused, let him remember that we are distinctly discussing development with respect to two things: First—the embryo, which of course, includes the embryonic area, and, Second—the remains of the ovum or original blastodermic vessel in its relations with the extra embryonic membranes, or that portion of the original tri-laminar structure now somewhat quadri-laminar that extends beyond the margins of the embryo to, and into relation with the wall of the ovum or blastodermic vessel.

The student should also remember that when the embryo "folds off" from the wall of the ovum or vessel it is entirely surrounded by specialized structures, that are attached to the wall of the vessel, called the chorion, which consists of placental and non-placental parts. And that from its inner surface, by the separation of the ectodermal layer, from the entoderm, and the division of the mesoderm, into two layers, there is formed the somatic that joins the ectoderm and the splanchnic that joins the entoderm.

There is also a fold that extends from the chorion which surrounds the margins of the placental area down to the margins of the closing embryo, which, from those margins, in its further extent forms the inner wall of the coelomic cavity ❧ ❧

This fold, from the chorion to the margins of the embryo, is called the amnion and the cavity thus constructed the amniotic cavity.

It will be seen at this juncture that the cavities in the blastodermic vessel or ovum are the amniotic, which is the remains of the vitelline or yolk sac and those cavities which

are within the embryo and are the remains of the coelomic cavity and a portion of the original vitelline cavity.

As the body of the embryo, by the folding of its margins, gradually closes up at the ventrum, there is formed, from its ventral and more feetward aspect, a fold classified as an entodermal sac, which lies beneath the embryonic area. The fold that thus projects is called the *allantoic diverticulum*, which is really the primitive umbilical cord; but it is called during this period because, by the changes of position it seems to be behind the embryo—the body-stalk.

¶ As further changes take place the body-stalk comes to form what would be called from the erect position, the inferior boundary of the umbilical orifice.

There is incident to the body-stalk, which is also called the allantoic stalk or allantois, the mesodermal sheath by which the embryo is connected to the chorion in relation with the body stalk and along which the umbilical arteries extend to the chorionic villi of the placental area and along which the corresponding veins extend.

From this allantoic stalk is formed the bladder and rectum. That portion of it that extends from the apex of the bladder to the umbilical orifice is later converted into a fibrous cord, the *urachus*. After birth of the fetus, the arteries and veins are also transformed into fibrous strands.

That portion of the allantois which is outside the embryo and takes part in the formation of the umbilical cord and placenta separates from the fetus at birth.

It will be remembered that the vitello-intestinal duct is at first that wide opening that connects through the margins of the embryo with the yolk-sac; but as these margins close it is said to extend through the umbilical orifice. The umbilical cord is the structure that takes the place of what is earlier called the body stalk and the allantoic stalk. It is formed by the fusion of these stalks with the vitello-intestinal duct and the remains of the yolk-sac.

The mesodermal core of this cord is said to be fibro-mucoid and contains the blood vessels which are, the two umbilical arteries that are wrapped spirally around the single umbili-

cal vein. The umbilical cord is described as extending from the umbilical orifice to the center of the placenta; but the student will remember that this is only true in part for the umbilical vein extends to the liver of the embryo. The cord is at first short and straight but increases rapidly in length, so that at birth its average length is twenty inches. However, the length of this cord varies greatly.

THE PLACENTA

While what has been said may seem to the student to have covered this portion of the subject, he must remember that in a way they have been prefatory to a clear presentation of the facts here to be set forth.

The attention has been particularly directed to the non-placental portions of the chorion; but here the attention is specifically directed to the placental portions of the chorion, and first to what is called the *chorionic villi* ❧ The chorionic villi are hair-like cell processes which begin to grow, in the region that is to be the placenta, and extend into the subjacent uterine tissue, that is, into the *decidua basalis*.

For a time in the early phases the villi cover a wider area than is to be placenta; but as they increase in size and complexity, those outside of the placental area atrophy and disappear ❧ ❧

By the full development of chorionic villi the placenta is formed ❧ ❧

The placenta is the mechanism that brings the organism of the embryo into nutritive relation with the mother ❧ It must not be thought, although books on this subject lay it down as being so, that the placental arrangement is such, that blood from the mother ever reaches the embryo, for that is not true.

In the placenta the structures that grow from the wall of the uterus, and those that grow from the embryo, are so completely interwoven that the maternal and embryonic systems of liquid movement are brought sufficiently near for lymph transmission and the transfusion of gases.

What is later known as the fetal placenta, which is an outgrowth from the embryo; and the maternal placenta, which is an outgrowth from the mucous lining of the uterus occurring, at the point, corresponding to the center of the embryonic area, interdigitate and appear as one structure and as such are called the placenta. ¶ The student must observe that the fetal placenta is formed from the chorion at the center of the embryonic area, which grows into the *decidua basalis* or mucous membrane of the uterine wall. The maternal placenta forms in that portion of the mucous lining of the uterus, upon which the ovum first rested after its impregnation, called the *decidua basalis*, and is completed by its growth into the placental area of the chorion. ¶ The student must understand that the placenta is composed of the decidua basalis, the placental area of the chorion, and the oolemma or vitelline membrane of the ovum, which by the changes designated, is considered with the placental chorion.

In the changes that take place in the decidua, three layers or characters are classified: 1, the deepest part—called the *unchanged layer;* 2, the area in which there is much thickening of the glands, vessels and nerves called the *stratum spongiosum*, and, 3, the most superficial thick layer in which there is a lessening of the glandular tissue and is called the *stratum compacticum*.

In order to form the maternal placenta the three layers of the decidua are changed, as follows: 1, the unchanged layer retains its character throughout the entire process of gestation; 2, the stratum spongiosum is modified by the disappearance of the lining epithelium, and the spaces between the cells are flattened out into cleft-like slits; and 3, the stratum compacticum is modified into a basal layer, and external to that a layer of blood sinuses that are interwoven with the blood sinuses of the fetal placenta.

The interwoven blood sinuses of the fetal and maternal placenta come to lie so close together, that the blood in the sinuses of the mother, and those of the fetus are only separated by thin layers of epithelium.

Through the intercellular spaces of the epithelia between the placental villi, the lymph from the blood of the mother passes to the lymph of the fetus, carrying nutritious substances and oxygen into the blood of the fetus. In like manner lymph from the blood of the fetus passes, in the opposite direction, carrying with it depuratory substances and carbon dioxide, which through the lymph, reaches the blood of the mother.

In the manner described, nutrition and the transfusion of gases necessary to the life of the embryo and later the fetus are performed.

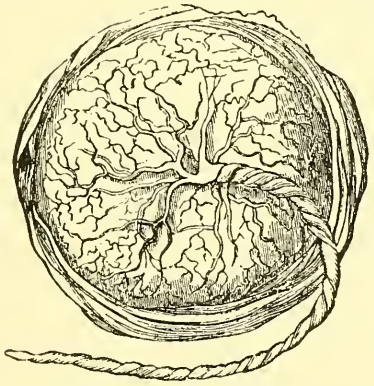


FIG 7—PLACENTA—FETAL SIDE

The student should know that the Amnion, and Chorionic Membranes have been torn from the margins in the illustration.

When the placenta is fully matured it is a discoid mass about twenty inches in circumference and one and one-fourth inches in thickness in its center, becoming very thin at its margin; where it is continuous with the non-placental chorion. When fully matured it weighs about one pound. At this juncture, in order that the student may not be confused, he should recall that when the placenta has attained its full size the amniotic membrane has so expanded with the growth of the fetus that it has been pushed back into contact with the chorion, which lines the whole uterus, and has completely fused with it, so that these membranes have become one.

In connection with the statement in the last paragraph the student should also remember that the *decidua capsularis*, which was the mucous membrane covering the ovum in early pregnancy, is with the development pushed back into relation with the *decidua vera*, with which it has fused, thus obliterating the uterine cavity except that found in the amniotic cavity.

It must also be recalled that the decidua vera which was the original mucous lining of the uterus, aside from the decidua basalis, has changed, becoming less vascular and glandular, and finally has become a thin membrane; the inner surface of which is fused with the decidua capsularis in the obliteration of the uterine cavity as before stated.

In closing, I wish to call attention once again to the fact, that nutrition of the fetus is not by direct transfusion of blood from the mother; but is by the extrusion of lymph from the blood of the mother into the lymph spaces of the placenta and thence into the blood of the child, and that depuration from the child is by the extrusion of lymph from its blood into the lymph spaces and thence into the blood of the mother, so that these phenomena present us nothing different than assimilation generally, and while wonderful beyond expression, they differ in no respect from the every-day processes of nutrition of an organism.

The student is urged to use the thoughts presented as an outline and guide and to investigate the details of embryology in the various books that treat upon it, especially Gray, Cunningham, Garrish, etc.; not particularly for the purpose of obtaining more information, but from the multiplicity of theories and ideas presented to more fully saturate himself with the simplicity of these truths.

CHAPTER NO. 17

Embryo, Folding Off—Delivery

FOR the purpose of this chapter, the student should recall that the following processes have been described: Impregnation, fecundation, imbedding in the wall of the uterus, the formation of the fetal membranes which are for protection, the placenta which is the medium of nutrition of the forming child and the phases of development of the embryo. It is at this juncture of development that the remarkable process called " the folding off of the embryo " should be described, this description has been so indifferently accomplished that students have had difficulty in understanding how the transaction occurs.

It should be understood, " that folding off " is nothing more than the separation, of the now partly quadri-laminar embryo from the wall of the blastodermic vessel, which was the wall of the ovum, and later called the vitelline wall, at that part of it corresponding to the original cone of attraction.

The separation from the wall of the ovum, is to give the embryo room for development; for so long as it remained a flat structure, attached to the wall of the ovum, or blastodermic vessel, it could not assume its characteristic form. ¶ There is also the further reason for the separation; that at this stage the machinery of nutrition has become sufficiently formed that the embryo can be maintained more perfectly, at a greater distance from its source of supply.

In " folding off " from the wall it will be understood that the embryo simply drops into the cavity, away from the wall of the vessel, so that it comes to float, as it were, in that cavity, attached to a point which was the original cone of

attraction; then the embryonic area, but now the placental area ☙ ☙

The student should understand that the most marked folds which distinguish the embryo from the fetal membrane at the margin will be, the primitive head and opposite end, or what is called the cephalic and caudal folds, and that there will also be folds indicating the lateral limits of the embryo.

These several folds the student will understand are the margins of the embryo, that are passing around, in different directions, to meet at the ventral side of the axis to close the body cavity.

It will be seen that when the embryo has in this manner "folded off" it contains within its innermost parts a portion of the original blastodermic cavity nearly surrounded by the coelomic cavity, and it will be understood that the inner cavity is the primitive alimentary canal and that the coelom, or outer cavity, is the primitive thoracic and abdominal cavity.

It will be understood that neither the inner cavity nor the outer cavity is at first closed, but that each relate to the umbilic orifice which by closing finally entirely separates these two cavities.

THE EMBRYO

The embryo, after "folding off," is clearly distinguished from the tri-laminar structure of the general ovum. The head and trunk show characteristic formation but there are no legs and arms. But now it proceeds with rapid development, especially as to the head and upper body.

All of the various characters of tissue begin to present themselves, and the muscles, glands, vessels and organs begin rapidly to take on shape, the details of which will be found quite clearly set forth, under the proper headings in almost any standard anatomy.

As has been indicated the trunk cavity has already been formed and partly divided into two cavities, the outer, or coelomic and the inner, which is the remains of the blastodermic ☙ ☙

It has been indicated that the coelom composes the thoracic and abdominal cavities and that the inner enclosure is the nutritive cavity and is the primitive alimentary canal ☙ At the present stage of development, the nutritive cavity is referred to as the gut; that portion of it headward being called the *fore gut*, which is closed ventrally, by the cardiac fold: That extremity of the embryo called the caudal fold, bends under itself ventrally from all sides, enclosing a cavity, called the *hind gut*: That portion of the cavity enclosed by the lateral folds of the embryo and extending from the fore gut to the hind gut is called the *mid gut* ☙ It will be understood that these guts freely communicate with each other, and that the mid gut is open to the general blastodermic, or vitelline cavity, until it closes to form the umbilicus.

With this simple description, which is only intended to aid the student in his investigations in the more extended and detailed works now in print, and urging him to make extended investigation of those works, with this as his outline, we turn to a few thoughts as to:

THE FETUS AND DELIVERY

In the human family the period of gestation is ordinarily considered to be nine calendar months, or from two hundred and seventy to two hundred and eighty days.

It may be valuable to the student as a comparative fact, to know that nine months is also the period of gestation, in those jungle folks most similar to man such as the ape, baboon, gorilla, etc.

The period of gestation includes the whole time from the embedding of the impregnated ovum in the mucous wall, to the time of the expulsion of the fetus from the uterus ☙ Gestation is considered in three periods: the period of the Zygote: the period of the Embryo: and the period of the Fetus. ¶ The end of the period of gestation is called "full term," which means that all of the phases of development have been passed through, and that the child is ready for extra-uterine existence.

The actual expulsion of the fetus, at full term, is called "delivery," which term is equivalent to that of "giving birth" in ordinary speech, or terminology; and is technically called parturition.

Up to a few hours before delivery the cervix of the uterus remains closed and fixed; then it suddenly undergoes relaxation and dilation, and this is the beginning of parturition.

Soon after dilation of the cervix of the uterus the amniotic sac bursts, with a discharge from the uterus, of the amniotic fluid. This discharge is usually referred to as "the waters."

The amniotic sac is ruptured by the descent of the fetus from the abdomen into the pelvis, which is called, "engagement," or "becoming engaged in the pelvis preparatory to delivery."

From the time the fetus engages in the pelvis until it is fully born, the conduct is called "expulsion," which conduct includes that of passage through the vagina out of its orifice.

So soon as the fetus is expelled, it must instantly begin the processes of extra-uterine existence, which primarily consists of breathing, or respiring the atmosphere.

So soon as breathing begins, the umbilical cord must be severed. This cord, it will be remembered, connects the child's system with that of the mother through the placenta, which becomes inactive at delivery.

As soon as the placenta becomes inactive, aeration must be accomplished by the child by the ordinary extra-uterine method of breathing, or death must soon ensue.

Shortly after delivery of the fetus the conduct called, "afterbirth" is accomplished. This consists in the separation of the placenta from the wall of the uterus, which is, at this juncture, in the process of contraction, and the delivery of it, with all of its appendages, called the fetal membranes from the uterus and vagina, which completes delivery.

Part Three

Physiology

With Anatomic Synopses Sufficient
for Student Aid

CHAPTER NO. 18

How to Study Anatomy

CONTRARY to the general idea, the acquisition of a knowledge of Anatomy is not difficult, if the study is pursued from the right standpoint, and by the process of deduction.

This book is not an Anatomy but in order that it may be understood it is necessary that the student shall acquire a very careful and comprehensive knowledge of that subject, and the purpose of this chapter is to offer a few simple suggestions, which, if followed, will render the task before the student very much easier. It will, in any event, place the student in the advantageous position of knowing where to begin and how to pursue his studies.

The human body is, in our highest concept of it from a physical standpoint, a machine. The student should address himself to the work of learning the anatomy and physiology of the human body just exactly as he would address himself to the work of learning the mechanism and operation of a machine

In pursuing the study of anatomy, from the machine standpoint, the student is confronted by the wonderful fact, that there is a remarkable difference to be given full scope and consideration

The ordinary machine is as an adult, that is to say, its parts are all full grown and therefore, there is nothing to be taken into account except the form, shape and action of each part; and the relation of the several parts to each other and the modes and methods of their attachment together; while in a study of the human machine this is only true of the adult; when the subject is referred to the period of the development of the machine, or the period of growth, it is true only by approximation.

It will, therefore, be found that before adult anatomy can be understood it will be necessary for the student to have acquainted himself with what, for use of a better term, I shall call developmental anatomy, that is to say, a consideration of the details of development or growth leading up through the various steps and phases to the adult machine.

It will be understood that the subjects last referred to are biology, bio-embryology, embryology and extra-uterine growth. The single purpose of this chapter is to furnish the student an outline for a wider development and it is believed, that what is here stated is sufficient for the practical needs of the student.

When the student has finished the study of Embryology, he should take up a consideration of the subject of tissue and should at once bring himself to a realization of the unit of tissue, and should understand that what is meant by unit is the smallest part of tissue that is conceived, as being capable of isolation, or separate consideration, and is commonly called an animal cell. At this point it is of the utmost importance that the student shall understand that, as to the animal cell, there is something approaching an intellectual novelty. It must be understood that the animal cell is fully as capable of divisibility into its several parts as is a tissue.

The only reason that the anatomy of an animal cell is not discussed by histologists is because, so far, we are not possessed of any magnifying machinery by means of which we are enabled to make so minute an investigation.

This fact, however, does not hinder the student who is pursuing the deductive method of study, from comprehending the truth. In other words, the same law of size, shape and relation applies to the components of an animal cell, just as size, shape and relation of animal cells apply to tissue. With these thoughts in mind the student will be prepared to take up the details of histologic data as he will find them set forth in works upon those subjects.

To complete the student's preparation, to enter the broader field of investigation of data, the additional basic terminology herein will, it is deemed, be sufficient. When the student has

brought himself to a comprehensive knowledge of what tissue is, he is then prepared to enter upon the real study of the human machine, but in doing so he should never for a moment lose sight of the biologic and physiologic phases which inhere in a consideration of each anatomic part.

Starting from the standpoint of his knowledge of what tissue is, he should carefully take up a consideration of Basic Terminology, that is to say, the names of the various classifications of tissue, that form a part of the human organism, and should carefully trace each of such tissues, to its embryologic origin, to the earliest histologic recognition of it.

That is to say, bone, cartilage, ligament, tendon, aponeurosis, fascia, muscle, membrane, glands, etc., as characters of tissue should all be traced back to their first appearance embryologically ❧ ❧

Having completed the work as outlined in the preceding paragraph the student is ready to begin for the first time the study of the human organism and as to it, he should remember that two phases present themselves for consideration.

¶ First: The topography, that is to say, a description of the surface appearance of the organism as a whole, or the surface aspect of its several parts. This is called descriptive anatomy and of course includes the size and shape of the organism, or the size and shape of the organs or parts.

Second: The internal construction of the various organs and parts of the anatomy which is usually classified under the head of histology, but which it will be clearly seen is only another phase of descriptive anatomy of the greatest importance to the student, for a perfect knowledge of the superficial aspects of the parts of an organism would indeed be of little value, without an intimate knowledge of the plan of construction of each part and the relation that each of such plans sustains to the organ, and the relation of each of such systems to the construction of the whole organism.

In view of what has been said it is of the utmost importance that the student shall systematize his work, and as a primary step in doing so, should adopt a terminology of description that is plain, simple and exact.

Anatomists have used two positions in the adoption of their terms which the student must understand and remember when reading such works.

Much description is given from the body in the erect position, the hands at the sides with the thumbs out, while other descriptions are made from the dissection aspect, the cadaver upon the back, the hands by the sides with the thumbs out as.

Descriptions are given from the position of the part, at the time of describing, so that the student of descriptive anatomy, must always make certain, first, that he understands the position of the organism, organ or part, at the time of description, as well as the position of the describer, to make certain that he understands the description.

The terminology given in the next chapter will apply to the organism or any part of it in any position.

CHAPTER NO. 19

Descriptives—Anatomic and Physiologic

IT is the object of this chapter to furnish the student with terms so exact and simple that he may never be at a loss for their meaning, and may never be in doubt as to what they describe.

The terms here given apply equally to anatomic and physiologic description. They are general and classification terms.

The Mesial line—a line that would divide the normal body, lengthwise, in half. A body marked off as to mesial lines, presents a ventral mesial line, while the corresponding line on the other side of the body will be the dorsal mesial line.

Mesial plane—the surface exposed by dividing a body on the mesial line. The mesial plane is obtained by cutting from one of these lines to the other; the two surfaces thus presented will be mesial plane surfaces.

The mesial line or one drawn parallel to it, is a sagittal line. If a line should be drawn parallel to the mesial line both ventrally and dorsally, at any distance therefrom, and then one should cut through from one such line, to the other, the surfaces thus presented would be *sagittal planes*.

Horizontal, as a descriptive term, signifies a line parallel to the horizon. This is novel, for it is not a line curved like the surface of the earth.

A horizontal plane, therefore, would be parallel to the horizon, and it will be seen, that in order to locate it in a description, the student would always have to first ascertain the position of the body at the time of the description.

In order to accurately describe surface or structural points lateral from the mesial line one must always have in mind the imaginary mesial plane of the organism.

From the standpoint of the mesial plane, any point or place away from it is expressed as being *lateral*. It must be remembered that this applies as well to the appendal portions of the body as to the trunk. Each leg, for instance, is lateral to the imaginary mesial plane.

In a comparison of two points or places, both of which are lateral to the mesial plane, but are differently related to it, the one nearer the mesial plane is described as being *mesial*, while the other is described as being *lateral;* therefore, the ulnar side of the forearm is described as being mesial, while the radial side is described as being lateral.

The anterior, front, under side, or belly, of a part is described as being *ventral*, while the opposite side, sometimes apparently without reason, is described as being *dorsal*. To illustrate the lack of reason for this last differentiation, the top of the foot is called the *dorsum*, because it is opposite the *plantar*, or *ventral* surface.

Headward, signifies toward the head. *Feetward* toward the feet, from any given point.

Combination terms are as follows: *Head-ventral*, means an oblique line, toward the head and ventrum. *Feet-ventral*, signifies an oblique line, toward the feet and ventrum. *Head-dorsal*, means a line obliquely toward the head and dorsum. *Feet-dorsal* means a line, obliquely toward the feet and dorsum. *Head-ventro-lateral*, means a line toward the head and ventrum, that is also oblique to the mesial plane. *Head-dorso-lateral*, means a line toward the head and dorsum, that is also oblique to the mesial plane. Toward the feet these last descriptions are the same, except that they begin with, feet.

Anatomically there are two positions of the body from which certain descriptions are given that the student must carefully fix in mind to avoid confusion. The first, are given from the idea of the body being in the erect position, in which points or places compared toward the top of the head are called *headward;* and opposite points or places are called *feetward*.

¶ Sometimes instead of these words, there will be found cephalic, pre-axial or superior which are equivalents of headward, and caudal, post-axial or inferior which are the

equivalents of feetward. I wish, however, to discourage the use of such terms since the object of all should be to encourage the selection of single technical terms, that are exact, where that is possible.

Terminology is applied to the body in the dissection position, that is, lying upon the back, with the thumbs out. Anatomists describing certain organs and parts from this position frequently fall into the error of using the term superior for ventral and inferior for dorsal. The student must always be on guard for this error.

Proximal is used to indicate a place near a given point of description, while *distal* refers to a point or place farther away. These words are frequently used in anatomical descriptions generally, but they should be confined wholly to the extremities, thus; the tuberosity of the humerus is proximal to the shoulder joint, while any point selected farther down the bone will be distal.

Each cavity, shaft or part is described as having an axis which is a line extending through it lengthwise, equidistant from its surfaces, therefore all parts of a body are described as presenting certain relations to its axis, or axial line. The line around which a part turns is called its axis.

Movements are classified from the standpoint of their axes, therefore, a part that moves in but one line is described as having *axial movement*, a part that moves two ways is said to have *bi-axial movement*, a part that moves in many ways is said to have *multi-axial movement*, sometimes described as *poly-axial*—the first term being preferred.

A part that moves in any axis around a center is said to have *circumductory movement.*

When a part is moved from the axis or mesial plane it is said to be *abducted.* A part moved from a point more distant, toward the axis or mesial plane, is said to be *adducted.*

With these descriptive terms well in mind the student is ready to begin the actual task of investigating the parts or segments of the body, and his attention should be directed:

¶ 1. To the denser, more resistant, and least animal parts, which are classified as the skeletal system and includes bone,

with certain cartilages, and ligaments and receives the general classification name of *Osteology*.

2. The articulatory or joint system, which includes the extremities or edges of bones, certain cartilages and ligaments and is called *Arthrology*.

3. The muscular system, which includes the study of the muscles, their membranous coverings, fascia, aponeuroses, ligaments and tendons, classified as *Myology*.

4. The nerve system, which includes the brain, vertebral cord, nerve trunks, nerves, ganglia and plexuses, all of which is considered under the general title of *Neurology*.

5. The vascular system, which includes the heart, arteries, veins, capillaries, intercellular lymph spaces, canaliculi, lymph capillaries, lymph vessels, lymph ducts, and lymph glands, all of which is classified under the head of *Angiology*.

6. The respiratory system, in which is included, the ventral nares, respiratory nares, dorsal nares, naso-pharynx, oral pharynx, larynx, trachea, bronchial tubes, bronchioles, infundibula, alveoli and the lungs. All of these are considered under the head of *Aerotology*.

7. The digestive system, which consists of the alimentary canal, or food tube, and the glands, which by their function, are accessory thereto; and are the salivary, at the mouth; gastric, at the stomach; spleen, liver and pancreas at the intestine; and should be considered under the head of *Alimentology*.

8. The urinal system, which requires a consideration of the kidneys, pelvis of the kidneys, ureters, urinary bladder and urethra ☙ ☙

9. The integumentary system is a study of the skin and its appendages. In this study care should also be given to the skins of the inner surfaces of the body termed serous and mucous membranes.

The urinal system, and the integumentary system, together with all organs that perform similar functions are comprehended under *depuratology*.

10. The reproductive system, which requires a careful study of the ovaries, Fallopian tubes, uterus, vagina and pudendum

of the female; and the testes, vas deferens, seminal vesicles, ejaculatory ducts, urethra and penis of the male. Many details of these organs are not here indicated. The whole system should be considered as incident to Bio-Embryology.

11. The study of all of the internal organs or viscera is classified under that comprehensive term called *Splanchnology* ☙

12. It should be remembered that the infinitesimal microscopic structure of all these organs is considered under that branch termed *Histology*.

13. In addition to the terms already given the student should remember that the divisions of cavities and parts are said to be of two characters:

The first is based upon the *morphology* or *structure* of the part, which is said to be a morphologic or structural demarcation or separation, such for instance as occurs in the alimentary canal, at the pyloric orifice of the stomach—there structurally the stomach ends and the intestine begins.

The second is called an *arbitrary* demarcation or separation, such for instance as that where the jejunum ends and the ileum begins, the point being arbitrarily fixed as being eight feet from the duodenum, there being nothing structural to mark the place.

In morphological description we have the word *homology*, which indicates the same organ produced in different animals.

¶ The organs in one animal that in function correspond to those of another are said to be *analogous* and all such parts are considered under the term Analogy.

The *vertebrates*, of which man is presumed to be the highest type, are classified as being *homologous* in structure, and *analogous* in function.

A more extended description of these terms will be found in general books on anatomy, histology and physiology; but those given will be sufficient for the practical needs of the student ☙ ☙

CHAPTER NO. 20

The Human Organism

THIS book does not assume to state anatomy. The anatomic synopsis at the beginning of each department of Physiology will direct the student to a proper investigation of the necessary anatomy, to understand what is herein stated.

The classification as given in this chapter will materially aid the student in acquiring an understanding of Physiology; that is, an understanding of how the human machine works in its various departments, and how those departments work co-ordinately

The student of anatomy should address himself to the structure of the body as a mechanic does to the structure of a machine, keeping constantly in mind the whole machine, while giving comprehensive study to its minute parts in detail

History discloses the fact that anatomy has not been studied nor developed upon that basis. The science of Chiropractic has introduced that innovation. The human organism, when looked at as a whole, is seen to constitute a very complete machine, the material elements of which comprise its entire study. The student of anatomy need not consider it in any other light.

It is only when the student leaves the study of anatomy and addresses himself to the study of physiology or function, under whatever head designated, that he needs to take into account phases, nor necessarily material or mechanical

Anatomists have considered the human organism under the following divisions:—head, trunk, upper and lower extremities. It is only necessary to say in passing that this division relates wholly to the bones, or skeletal frame, and that since

it is not sufficiently comprehensive to include all of the bones, and not so regulated as to aid in the description of all of the parts, it is therefore incompetent and should be discarded. ¶ The Skeletal Frame is divided for convenience of consideration into the *bones of the head*, *bones of the cervical region*, *bones of the trunk*, and *bones of the upper* and *lower extremities*.

The Bones of the Head comprise those of the skull, which include those of the ear and the bones of the face.

The Bones of the Cervical Region include the cervical vertebrae and the hyoid bone.

The Bones of the Trunk include the thoracic vertebrae, lumbar vertebrae, sacrum and coccyx, with ribs, sternum, scapulae and clavicles above, and the innominate bones below ☙ It will be observed that the scapulae and clavicles have formerly been classified as the shoulder girdle, and as such have been included with the upper extremities; while the innominate bones, classified as the pelvic girdle, have been included with the lower extremities. It is very clear that all of these are properly bones of the trunk, and they are so classified ☙ ☙

The Bones of the Upper Extremities are the bones of the arms, forearms, wrists, hands and fingers.

The Bones of the Lower Extremities are those of the legs, which include those formerly designated as bones of the thighs, and those of the ankles, feet, and toes.

The Bones of the Skeletal Frame are so arranged that they constitute several important cavities, which have been named, but the reader is cautioned not to jump to the conclusion that the cavities named comprise all of the cavities of the body, for such a conclusion would be a long way aside from the truth.

The principal cavities, however, are: The *skull cavity*, *auricular cavities*, *nasal cavity*, *mouth*, *pharynx*, *cervical cavity*, thorax, and the abdominal, arbitrarily divided into the *abdominal cavity proper* and the *pelvic cavity*.

The Skull Cavity and the Auricular Cavities are in that division of the head called the cerebral cranium. The Skull Cavity is occupied by the brain, and a large portion of nerves

and also by the so termed meninges of the brain, with their very rich vascular and nerve systems.

The Auricular Cavities are in the petrous portion of the temporal bone of each side, and are occupied in part by the external meatus, and by the middle ear with its mastoid antrum, Eustachian tube, and by the inner ear.

In the visceral cranium are the Nasal Cavity, the Mouth and part of the Pharynx. The Mouth Cavity is occupied by the teeth, alveolar processes, gums, and tongue. It should be added that contiguous to the cranium on each side is the external meatus of the ear; and on each side of the median line in front, the quasi-cavity, the orbit of the eye.

The Cervical Cavity is occupied by the larynx, part of the pharynx, trachea and esophagus.

The Trunk encloses one vast cavity, so far as its skeletal bones and walls are concerned, which extends from the body of the first thoracic vertebra to the pelvic outlet. This cavity, however, is morphologically divided into two very important compartments by the largest and most important and powerful muscle of the body, called the diaphragm.

The Diaphragm attaches to the ensiform cartilage, or feetward segment of the sternum ventrally, and to the costal extremities and ribs on each side, extending dorsalward and attaching to the body of the twelfth thoracic vertebra, while its crura attach to the vertebrae, down to and including the fourth lumbar.

The diaphragm is so shaped and placed as to constitute an irregular dome on each side of the median line, with a bi-convex surface looking headward, and a bi-concave surface looking feetward, and is so large and broad as to form a complete septum in the great cavity of the trunk, which is thereby separated into two principal cavities.

The cavity headward from the diaphragm, enclosed by the ribs, with their costal cartilages, the thoracic vertebrae and sternum, has been named the Thorax.

The Thorax is again arbitrarily divided into three cavities:— the right and left pleural, and the mediastinum which extends longitudinally throughout the length and depth of the thorax

in a median area. ¶ The Right Pleural Cavity is occupied by the right lung. The Left Pleural Cavity is occupied by the left lung.

The Mediastinum is encroached upon by part of the right lung. It is occupied by the bronchial tubes, esophagus, the great thoracic arteries and veins, the nerves, the pericardium, and the heart.

The cavity feetward from the diaphragm has been named Abdomen, and is enclosed partly by the ribs and their costal cartilages, the lumbar vertebrae, the sacrum, coccyx, and innominate bones. However, the greater part of this cavity is enclosed by soft tissue, which is comprehended under the term *parietes of the abdomen.*

The Abdominal Cavity, so called, is arbitrarily divided into the Abdominal Cavity Proper and the Pelvic Cavity. This division has been made at a line extending around from the pubes and across the sacrum, which is called the *Ileopectineal Line* ☙ ☙

The Abdomen Proper is that portion headward from the *plane* of the ileopectineal line.

The proper abdominal cavity is occupied, in the order named, beginning at the diaphragm, by the liver, stomach, spleen, pancreas, duodenum, transverse colon, small intestine, and the cecum, ascending and descending colon.

The pelvic cavity is found within the embrace of the innominate bones, except their broader or iliac portions, which cavity is closed behind by the sacrum and coccyx.

The Pelvic Cavity is occupied in part by the small intestine, part of the sigmoid colon and rectum. And, in the male by the bladder, prostate gland, vas deferens, and seminal vesicles. In the female, by the ovaries, ova-ducts, uterus, vagina, and bladder. Contiguous to the wall of the pelvis ventrally are the external sex organs of the male and female respectively ☙ ☙

It is hoped that this general outline will furnish to the student a valuable hasty reference, which will be of considerable aid in his analysis of the parts hereinafter referred to, and to an understanding of function.

CHAPTER NO. 21

Anatomic Arrangement for Physiology

IF we are to understand the physiology of the human body, it must be expected that certain other things must be understood, which in themselves tend to clarify the situation that it is desired to investigate. Of course, no one would hope to understand physiology, who did not fully understand anatomy in all of its details, for, of course, a knowledge of anatomy is at the threshold of physiology. However, an understanding of anatomy will not be sufficient to put the student in position to make deductions therefrom, unless he has further definite information of many things &c.

In order to understand physiology, it is necessary in addition to anatomic knowledge, that the student shall have an understanding of physics, as that subject relates to the application of force to matter, in all of its details.

The student must also have a thorough working knowledge of analytic chemistry, as that subject relates to the application of force to matter, and to the general subject of transmutation, or chemical elaboration.

The student must understand mechanical structures and the operation of mechanical appliances, which tend to the easy operation of the same, and those things which may oppose such operations.

In addition to the knowledge already indicated, the student must have a well-defined idea of the analysis of the human machine in order that, in any emergency he may always deduce from the facts under consideration, to those facts which may stand in the relation of cause, or effect, and that, therefore, may aid or retard function, or furnish an explana-

tion of the problem at hand. ¶ To this end, it is conceived to be well to divide the physiologic conceptions of the body into the following several departments:

1. The department of force.
2. The department of raw material intake.
3. The department of transportation.
4. The department of use.
5. The department of output.

The department of force, as has been heretofore indicated in this work, is composed of two parts; the immaterial, psychic or causative, and the material expression or effect.

The psychic department has been fully discussed in Part One of this work, and incidentally discussed and applied in Part Two, and nothing more need be said of it here, except that, of course, it must always be reverted to for the cause of animation; or changes in function in the human body.

The material department of force is comprehended in the brain and nerve system, for an understanding of which, it is necessary to make a very careful and deep study of all anatomic structures; and of course, the statements here made, will be based upon the thought, that the student has made such preparation. The physiology of the brain and nerve system, however, is briefly given in this work, with sufficient anatomic review for the immediate needs.

To understand physiology, the student must realize at this juncture that he must first understand the physiology of the brain and nerve system in all of its details, but particularly must he understand the animating phase of nerve stimulus when applied to tissue elements at the ends of organized channels, or nerves.

The department of raw material intake consists of the alimentary system and the respiratory system. The alimentary system is composed of the alimentary canal, a tube extending from the lips to the anus, which is the largest and longest tube in the human organism, and the accessory organs of digestion; being the salivary glands at the mouth, the gastric glands at the stomach; and the spleen, liver and pancreas at the intestine. Of course, in addition to these,

there is also, the mucous glands of the entire canal. The respiratory system consists of the tubes that begin at the ventral nares, and extend thence, through the nasal meatus, the dorsal nares, the naso-pharynx, the isthmus of the pharynx, the oral pharynx, the larynx, the trachea, the bronchi, the bronchioles, down to and including the infundibula and alveoli.

As a paramount, physiologic proposition, the student must remember at all times, when studying the alimentary and respiratory systems, that in a sense, figuring from the standpoint of operation of the organism, they constitute but one system, and that the system of raw material intake. All substances that are found in the human organism, if they have entered it by normal processes, have entered through either the alimentary or respiratory system. Any other substance that may be found in the body economy must have entered it by some abnormal process. In connection with the subject of raw material intake, it would be well for the student to keep in mind that there are several ways by which substances may enter the body by abnormal processes, such as injection, inoculation, endosmosis, and the like.

The department of transportation includes all phases of liquid movement in the organism, which is generally comprehended under the lymph vascular and blood vascular systems. The lymph vascular system, it will be remembered, is coextensive, with the entire animate body. Animation can not be maintained in the organism without lymph. It is a colloid carrying different amounts of solid particles. It is, therefore, the basis of all liquids of the body, with the exception of blood, and it composes the serum of blood.

Lymph is the liquid that receives all of the substances, whether gases or otherwise, from the department of raw material intake, and transports them to the blood. Lymph receives all substances from the blood, at the capillaries and carries them into the channels of depuration and elimination, or into the elaborations preparatory to assimilation. Lymph is also the avenue of movement of disintegrated, or morbid substances, from the area of their accumulation, into channels

of depuration and elimination, or back into the veins and blood. From these statements, it will be seen, that lymph is the most important liquid or substance, of the entire body; and that it is the liquid in which, and from which, all of the ultimate functions of the body are carried on.

The blood system is a common carrier, that functions between lymph of intake and lymph of extrusion. It receives all characters of substance absorbed from the alimentary system, or transfused through the respiratory system, and gives them off, with its serum, at the winking valves of the capillaries; where it receives all characters of gases from the lymph of the intercellular spaces and all characters of substances, in that lymph, when it re-enters the veins. It will be seen that the one important office of blood is that of, common carrier, and that it performs but one sole function, and that is transportation. This may seem a little strange to those educated to the blood theory, but it is a physiologic fact.

The department of use is the department of assimilation, or tissue construction; and consists in the final elaboration of substances in the spaces of the body, and their cohesion under force, or nerve stimulus, into animate structure. Assimilation receives extended discussion later, and will, therefore, not be given further attention here.

The department of output includes all of the depuratory channels, and channels of liquid transmission, but especially the tubes of the nose, ears, eyes, mouth, the pulmonary tube, the alimentary canal, the tubes of the skin, uterus and vagina, and the tubes of the kidneys including those of urination &c.

All of the tubes mentioned in the last paragraph, that open by orifices at the periphery of the body, are both depuratory and eliminating. Those that do not open directly to the periphery of the body, by means of orifices, are depuratory tubes &c. &c.

The nose, ears, eyes and mouth are eliminating. The alimentary canal is depuratory and eliminating. The accessory glands of the alimentary canal are only depuratory, for their excretions are only discharged into the alimentary canal, and may or may not be eliminated.

The respiratory tubes are depuratory, and may be eliminating, and are, as to some substances.

The kidney tubes are depuratory and may be eliminating, and are always directly eliminating; but it sometimes happens that occlusion occurs along the uriniferous tracks.

The sudorific and sebaceous tubules of the skin, are depuratory and eliminating, as are also, those of the uterus and vagina and the uriniferous tubes.

In connection with all of these statements, it should be recalled, that all of the ductless glands of the body, are depuratory and may, to some extent be eliminating; but they have no organized tubes, and their excretions leave their substance, in gas or liquid transportation, at first into lymph, and sometimes, through lymph into blood. That must depend on whether the lymph channel entered is directly eliminating or otherwise.

If these physiologic departments are well remembered by the student, as he pursues his study, he will avoid confusion and need not be long in obtaining a comprehensive knowledge of physiology

CHAPTER NO. 22

Basic Principles of Physiology

PHYSIOLOGY is a description of the functions of the various organs of the body independently or collectively. ¶ Taking the view of the organism as presented in the former chapter, we see only a machine with all of its elemental parts operating in harmony one with another, which is termed co-ordinance.

Viewing the human machine in its approach to perfection, we cast about for some appropriate term by which that condition shall be properly designated.

The term, natural, has been much abused by being used as a name for this condition. It is incorrect and is not a term that can be applied to this condition in any sense because all that is, is natural.

No matter how unusual a condition may be, it is none the less natural. If a twig were bent gradually so as to form a circle, and became a tree in that shape, the condition would be perfectly natural, although remarkably unusual.

Scientists would apply the term unnatural to such condition, or any unusual condition, but it is as completely apparent, since all phenomena are natural, that there is no condition which can be properly designated as unnatural, and the word should be eliminated from our language.

The term, usual, very nearly expresses the idea, with the term, unusual, to express the exception met with. However, there is a more comprehensive term which, because of its somewhat general usage relative to physical conditions, has been adopted. ¶ The term referred to is the word, normal. The only criticism that may be applied to this term, is that it presupposes a condition not existing. That is, that there is a standard of normality, which there is not.

It is conceivable, however, that there is in Formative Intelligence an image of what each human organism should be, and that image would be the normal.

Our knowledge, however, of the normal may not rise higher than an approximation. We conceive the organism to be normal, when all of its organs are performing their functions in such manner, that their co-ordinance results in a process without pain or uneasiness, free, active, and strong in every part. Any departure from such a process is correctly styled abnormal &c &c

It will be clearly seen that each individual is a law unto himself, as it were, and that the approximation, as to his normal process, and hence his phases of abnormality must be arrived at, as a separate and isolated study, aided only by relative deductions.

It is the duty of the student of physiology to form as complete a knowledge as possible of normal function, and in order to do so, it is very clear that his approximations must be made with respect to laws of abnormality as well as those of the normal, which includes that branch of study denominated pathology.

It is clearly apparent that physiology can not be studied abstractly by an observance of the function of the whole organism as an entirety, but the organism must be analyzed and its parts known and understood, not only relative to their own activities, but the activities of each must be understood with relation to those of each co-ordinating. It therefore becomes necessary, first to ascertain to what point the organism can be reduced, or in other words, to know, so near as possible, of what the organism consisted, in our first knowledge of it, and from that point to study its growth; the production of its various organs, and the reason therefor; the purpose of the formation of each, and the general object to be attained by all.

The application of this rule necessarily takes us back to the foundation of material existence, the dawn of zygotic life, or the impregnated ovum.

A person begins so far as physiology is concerned, in a

single cell, or cell element, composed of protoplasm, the lowest form of organized matter, and a clear water-like substance which is not well known or understood, and all of the laws of normality are seen to apply as completely to that substance in that humble origin, as to the most complete organism known.

Upon that physiologic fact is predicated the deduction, that behind the impregnated ovum, there must be an organized intelligence constructive and maintaining, producing and acting through the material parts of the ovum.

It is found that from this cellular center the organism is completed by a process of evolution, or the formation or production of additional cells, the distinguished and remarkable part of which is that these cells are produced and arranged apparently to fit a plan, which results in the formation of an organism, separate, distinct, and individual in all of its parts, but still in co-ordination and appearance similar, to other organisms produced under like circumstances.

Physiology of the organism, therefore, primarily consists in a knowledge of its cell elements or cells: (1). In the law of their production; (2). Their growth; (3). Their relation; (4). Their co-ordinance in conduct. It will be found necessary, before an understanding of these things can be had, to know the anatomy of the organism very thoroughly.

In beginning, a study of the physiology of the organism, therefore, it must never be lost sight of, that there is a central intelligence acting through all of the cells, or cell-elements of the body, by virtue of some process, which brings them into harmonious activity, in such way as to produce an individual. Therefore, while we speak of the different parts of the body, the different substances of which the body is composed, that is, bone, cartilage, ligament, brain, pulmonary, liver and kidney tissue, including every structure, it must be remembered that all of such parts are alike in being composed of cells or cell elements.

The differentiation of tissues consists wholly in the structure and arrangement of their cells, or cell elements, and that the names applied to them is only a more or less abortive attempt

to give a separate name to each characteristic structure, which is only valuable to the student, when such names assist in a clearer description of a part, and render a more comprehensive knowledge of its structure and, therefore, its function obtainable. ¶ Physiology, consists in an analysis of all of the various structures of which the organism is composed, for the purpose of developing the laws of their production, growth, reproduction, relation, and co-ordinance.

The student must never lose sight of the fact, while investigating a few cells of a given area, that they must of necessity bear direct relationship to the cells of any area of the organism, and that knowledge with respect to the one set of cells is comparative knowledge with respect to all of the cells of the organism.

Knowledge of the production of one cell is comparative knowledge, as to the production of every other cell; and knowledge of relation of one cell to another, is comparative knowledge as to the relation that exists between all cells. Knowledge of the co-ordinance, or conduct of two cells is comparative knowledge of the co-ordination of all of the cells of the body, or of the entire physiology of the organism. Generally speaking, there is a remarkable unanimity, in the physiology of all animate things, whether animal or vegetable.

The processes by which plants, and the so-called lower forms of animals exist, are so exactly similar as to render the material distinctions, so far attempted, very unsatisfactory. ¶ It is in animals where evolution has made the element of intelligence prominent that differentiations become marked; but these, under analysis, furnish little or no aid because the element of intelligence, after all, is an unknowable quantity. ¶ Intelligence does not depend for its existence upon material in any sense which physiologists understand; that is to say, it leaves no marks on matter that can be isolated or described. ¶ The physiologic aspect of intelligence is, that it acts through matter; but that matter is not a necessity to its existence, In other words, that intelligence is original and formative, and matter is but the vehicle through and by means of which it secures expression.

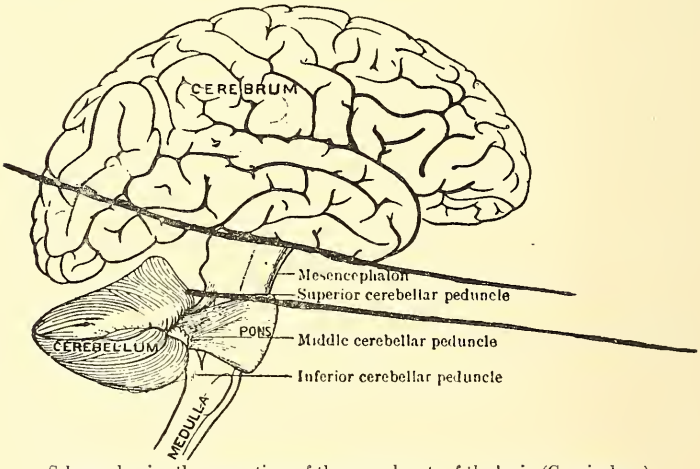
Based upon what has been said, it will be seen that physiology is the most important study in which a human being can engage. It is necessarily a study of himself, his origin, and his physical destiny, incidentally comprehending his ability to approach the normal constantly, or to constantly deviate from it, sinking into the labyrinth of abnormality, which means untimely decay and death.

CHAPTER NO. 23

Anatomic Synopsis of Nerve System

THE nerve system is said to consist of the brain and nerves ☙ ☙

The brain consists of two principal parts, the cerebrum and cerebellum. These are each considered as being, in two lateral halves, called hemispheres. The fissure separating the hemispheres of the cerebrum is called the longitudinal. The so-called fissure that separates the cerebrum from the cerebellum is called the transverse fissure.



Schema showing the connections of the several parts of the brain (Cunningham)

FIG. 8—MESENCEPHALON

The space between the black lines drawn across the picture indicates the mesencephalon, which is that portion that lies between the pons upon the one hand and the cerebrum upon the other.

Both the cerebrum and cerebellum are enclosed within the three coverings of the brain, called from the brain out, the *pia mater*, the *arachnoid mater* and *dura mater*. These three *maters* construct two water sacs, that enclose the brain, and

outside of the dura mater, the skull also, completely covers the brain.

The cerebrum lies in the headward chamber of the skull, above and ventral to the *tentorium*. The cerebellum lies in the dorso-feetward chamber, below the tentorium. These two principal parts of the brain are connected through the *mesencephalon* and the headward and feetward peduncles of

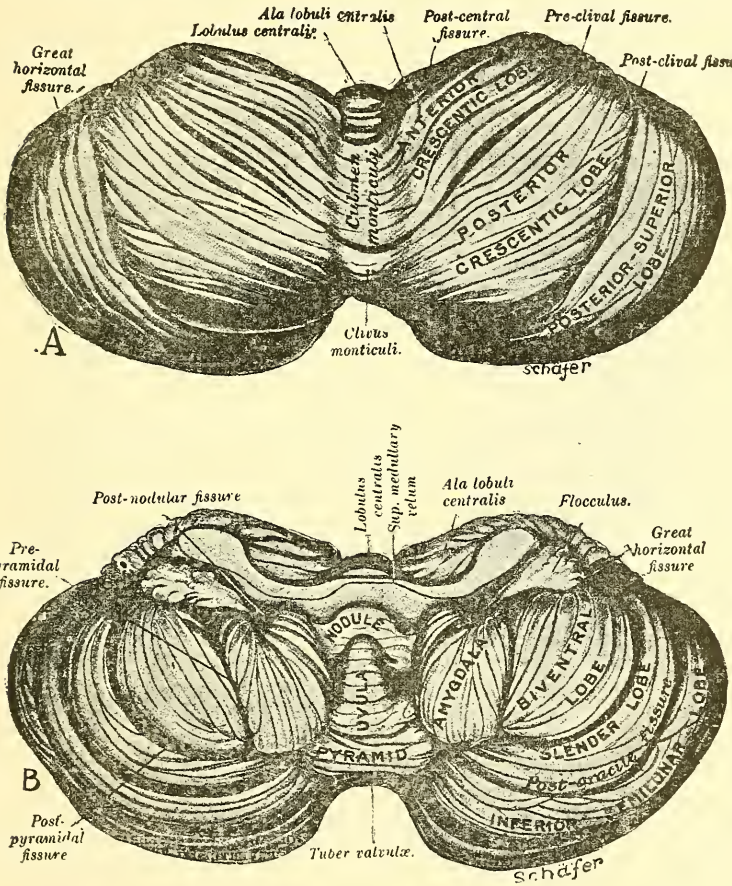
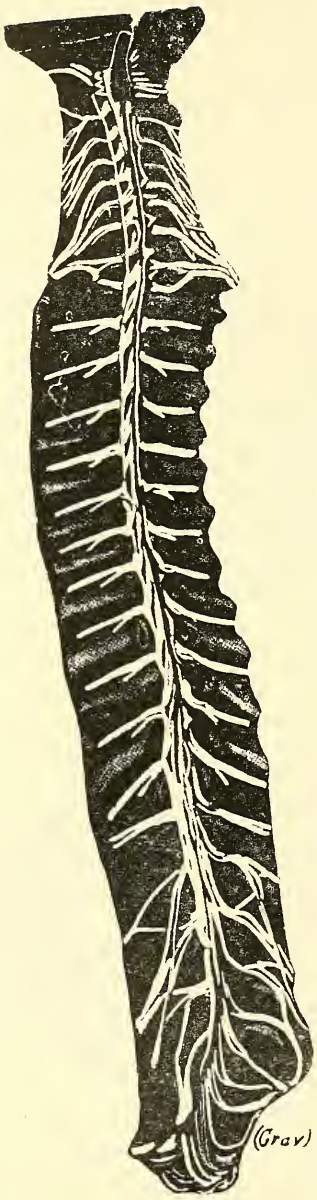


FIG. 9—HEADWARD AND FEETWARD SURFACES OF CEREBELLUM
A, Headward surface, showing convolutions and lobes; B, Feetward surface, showing lobes, also divisions of Mesial feetward surface.



the cerebellum, which arrangement necessarily includes the *Pons Varolii*, and *Medulla Oblongata*. The *mesencephalon* is principally composed of the *crus cerebri*, and quadri-geminal bodies. These structures are mostly composed of nerves extending from the brain toward the body, incidentally the headward peduncles of cerebellum, extend toward the cerebrum.

The nerves and ganglionic cells of the crus cerebri, together with those of the middle peduncles of the cerebellum, compose the pons varolii, which is a gangliated plexus for the rearrangement of nerves, to form cranial nerve trunks. The nerves and ganglionic cells, from this structure, together with the feetward peduncles of the cerebellum, compose the medulla oblongata, which is another ganglionic plexus, for the rearrangement of nerves, to form *cranial nerve trunks*. The nerves left after the formation of the twenty-four cranial trunks, compose the *vertebral cord*.

FIG. 10—DORSAL VIEW VERTEBRAL CORD AND INTERVERTEBRAL TRUNES

The student will note that the figure is turned slightly to the left. The dorsal part of the arch and spines of the vertebrae have been removed so that the membranes around the cord and the location of the cord can be seen. Also, the intervertebral trunks may be seen and some of the primary arrangement of trunks outside the foramina.

The cerebrum and cerebellum are composed, on their outside surfaces of layers of gray cells, which are called, the *cortex*, and from which all nerves of the system have origin. These structures have what is called the white medullary center, which is composed of *myelin*, and is a sustentacular tissue, to support and protect, the extension and rearrangement of nerves.

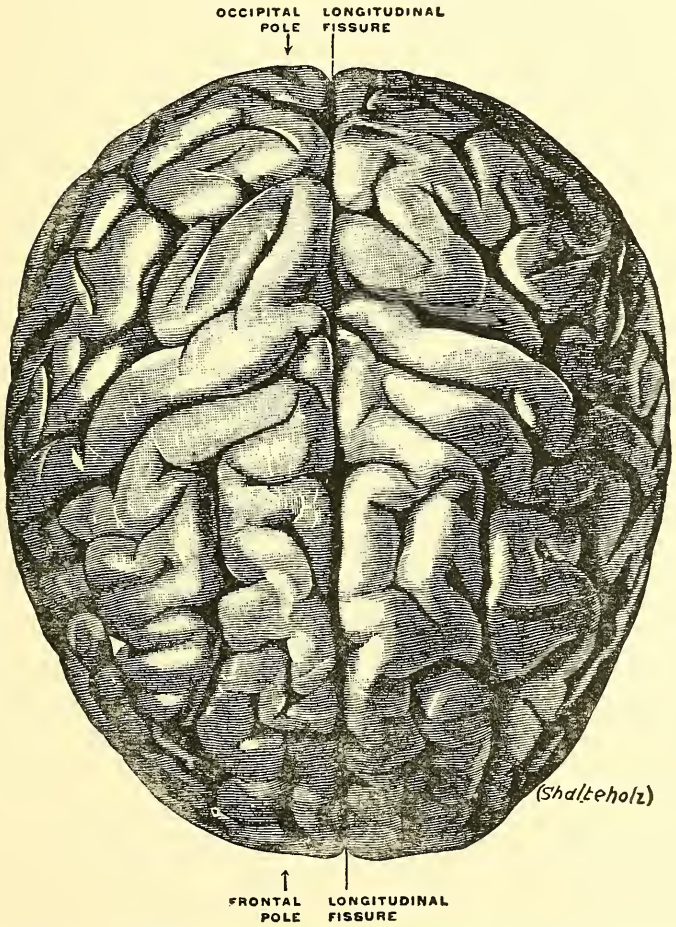


Fig. 11—Cerebral Hemispheres—Top View
The student is requested to note carefully the longitudinal fissure which, if open, would reveal the corpus callosum and also to note the convolutions of the cerebral cortex. One is looking down on this picture as though the skull and meninges of the top of the head have been removed.

The white medullary centers of these structures are almost wholly occupied by large ganglionic plexuses; in the cerebrum these are principally, the *caudate* and *lenticular nuclei*, *claustrum* and the *Island of Reil*, the *amygdaloid nucleus* and the *optic thalamus*. In the cerebellum, the dentate nucleus and the several smaller nuclei. The fact that these structures are called nuclei or thalami, does not change the fact, that they are ganglionic plexuses.

The nerves have origin in the cortex and extend to, inter-convolutional, interlobular, interhemispherical and interbrain ramification. Nerves that are not engaged in these phases of ramification, extend to different parts of the organism so

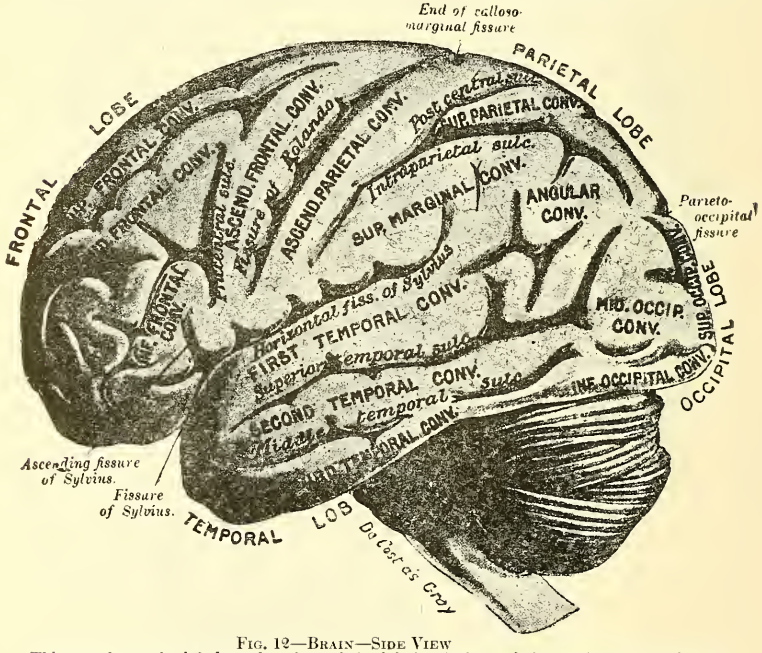


Fig. 12—Brain—Side View

This cut shows the left lateral surface of the left hemisphere of the cerebrum and also the cerebellum and feetward from the cerebellum part of the pons and headward half of the medulla. Note that the cut discloses and names the important fissures and lobes that are revealed from this aspect.

It has already been stated, that the pons varolii and medulla oblongata, are the centers, of rearrangement for extension, of

eight pairs, or sixteen cranial nerve trunks. The nerves left over from these are called, the vertebral cord, which extends feetward through the *foramen magnum* into the *neural canal* of the vertebral column to the level of the intervertebral substance between the first and second lumbar vertebrae, where it ends in the *filum terminale*, which attaches to the sacrum within the sacral canal and to the coccyx.

The vertebral cord gives off thirty-one pairs, or sixty-two intervertebral, nerve trunks. These trunks are for the supply, in a general way, of the whole organism.

Just outside of the intervertebral foramina, the intervertebral nerve trunks, divide into two principal divisions, the dorsal one of which, extends dorsally, from the foramina and ramifies the general tissues of the dorsum to the median line. The other principal trunk, immediately divides in two primary divisions, one set of which, extend laterally and ramifies the wall of the body around to the median line at the *venter*. The other primary divisions are the visceral branches, and extend ventrally into the trunk cavity and enter into the composition of the visceral, ganglionic nerve trunks, which compose, the basis of the system, so long known as the "sympathetic."

The arrangement just described applies to all of the intervertebral nerve trunks, except those from the eighth cervical, headward. The visceral division of these cervical trunks, instead of extending directly as visceral branches, as in the other cases, extend up inside of the neural canal within the dura-matral sheath, through the foramen magnum, where, as the vertebral contributions to the vertebral, accessory cranial trunks, they enter the sheaths of the pneumogastric trunks, and extend to supply the cervical and thoracic viscera by this protected route.

The visceral branches from the seventh cervical feetward, after having extended into the cavity of the body, and into the visceral nerve trunks, are rearranged to construct several very important ganglionic plexuses, the principal ones of which are, the *cardiac*, *solar*, *hypogastric* and *sacral*. Before describing these, it should be stated that after rearrangement,

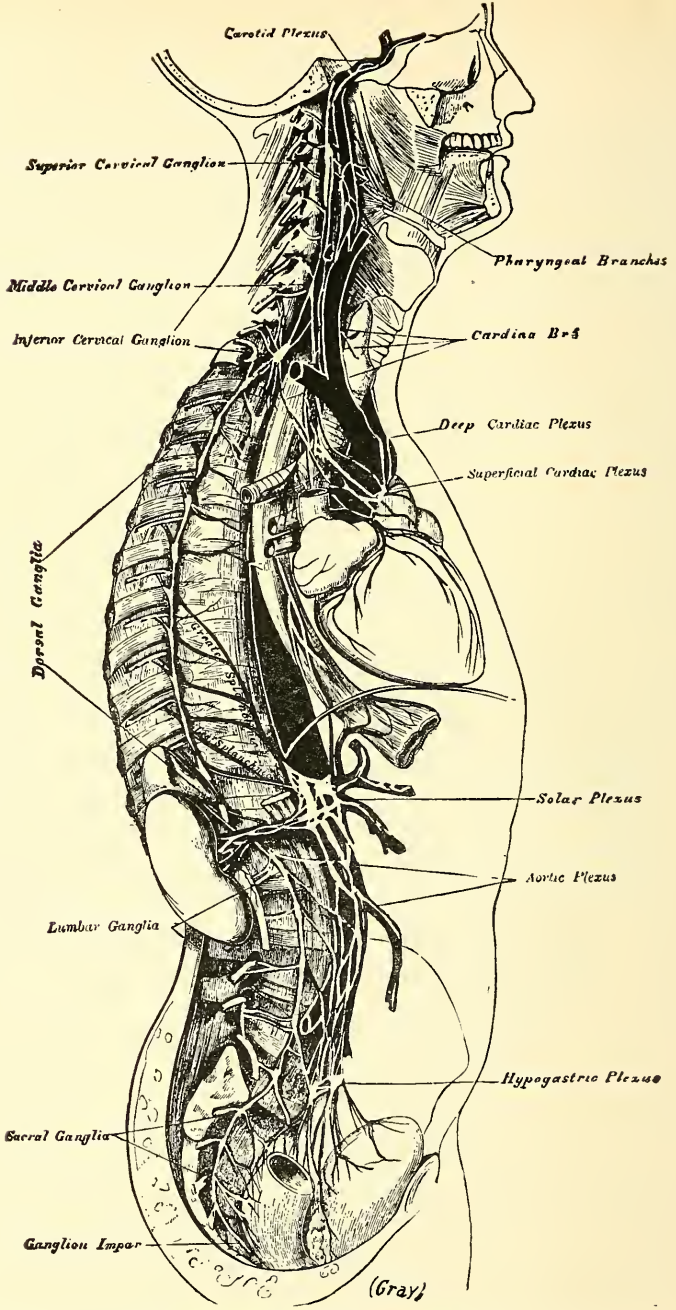


FIG. 13—VISCERAL NERVE SYSTEM

Cut shows a sagittal section slightly to the right of the vertebral column, showing, therefore, the right visceral trunk, its segments of origin from the intervertebral trunks and the several large ganglia and plexuses formed by trunks that are made up from it.

through the ganglia of the visceral trunks, there is a very rich ramification, not involved in the centers just referred to, but classified as being *immediate*.

The visceral nerve trunks, from the headward five thoracic, intervertebral trunks, generally extend headward in the visceral trunks, and compose three large cervical ganglia, called the *superior*, *middle* and *inferior*. The first being ventral to the atlas and axis, the second, ventral to the fifth and sixth cervical vertebrae and the third, ventral to the seventh and first thoracic vertebrae, relative to the head of the first rib. After rearrangement through these ganglia, there is a very rich immediate ramification to the relative tissue, extending to the eyeballs in the headward direction and to all of the viscera within the face and immediate cervical region ☙

From the headward ganglia two large cardiac trunks are formed, called the headward cardiac trunks, that extend into the thorax and aid in the formation of the *cardiac plexus* ☙

After rearrangement through the middle cervical ganglion, the nerves immediately ramify cervical viscera, and a second pair of trunks are formed, which extend into the thorax and also aid in the formation of the *cardiac plexus*.

From the feetward cervical ganglia, there is a rich immediate ramification, and the third pair of trunks, called the cardiac, extend into the thorax and complete the *cardiac plexus*, which, it is seen, is composed from six trunks, two from the headward cervical ganglia; two from the middle cervical ganglia and, two from the feetward cervical ganglia. In connection with what has been said of the visceral nerve trunks, it must be understood that there is, from them, a rich ramification, to all parts of the brain.

Nerves from the intervertebral trunks, from the third thoracic to, and including, the first lumbar, after being rearranged through the ganglia, of the visceral trunks, extend in three large trunks from each cord, called the splanchnic trunks ventro-feetward, through the diaphragm, where they form the great ganglionic arrangement, called the solar plexus, from which, after rearrangement, nerves extend to ramify substantially the entire abdominal viscera; the rami-

fication being considered generally as *hepatic*, *splenic*, *gastric*, *pancreatic*, *suprarenal*, *renal*, *intestinal* and *mesenteric*. A feetward sub-division of this ganglionic plexus is called the *aortic*, from which nerves especially ramify vessels of liquid movement, principally the blood vascular.

Feetward from the aortic plexus, and at the bifurcation of the iliac artery, there is another large ganglionic plexus composed principally of nerves that extend from the solar plexus, but also from lumbo-sacral contribution, called the *hypogastric plexus*, from which the feetward abdominal, and headward, pelvic viscera are largely ramified.

Further feetward in the pelvis, there is another ganglionic, plexiform arrangement, composed chiefly of lumbar and sacral, visceral nerves, called the *sacral plexus*, through which is accomplished ramification of the remainder of the pelvic viscera, with the exception of that ramified by the *pudic nerve trunks*, which are an arrangement from the sacral trunks ☙ ☙

The cranial trunks taken in their order from the headward aspect, are:

1st Pair—Olfactory.
2nd Pair—Optic.
3rd Pair—Motor Oculi.
4th Pair—Trochlear.
5th Pair—Trifacial.
6th Pair—Abducens.
7th Pair—Facial.
8th Pair—Auditory.
9th Pair—Glosso-pharyngeal.
10th Pair—Pneumogastric.
11th Pair—Vertebral accessory.
12th Pair—Hypoglossal.

The twenty-four cranial nerve trunks, are both somatic and visceral; that is, they ramify wall structures and visceral tissues. They are generally confined in their ramifications to the head and face; none extending beyond that except the hypoglossal, the glossopharyngeal, the pneumogastric and vertebral accessory. The last two ramify as far feetward as the thoracic viscera, the pneumogastric extending through the diaphragm, to the solar plexus, through which it is rearranged to the stomach.

Nerves, from the dorsal and lateral, primary divisions of the intervertebral trunks in the cervical region ramify the tissues

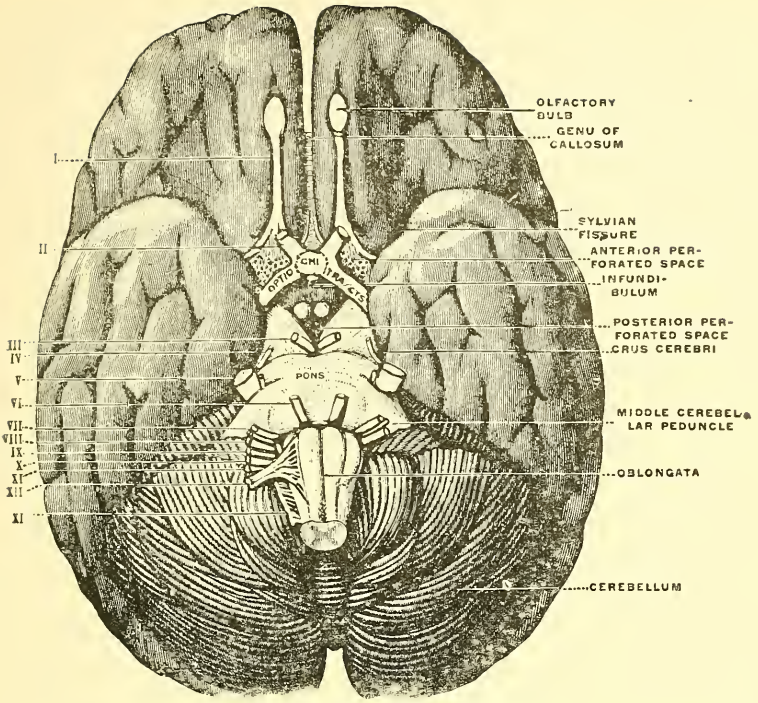


Fig. 14—Feetward Surface of Brain
Cut shows the median aspect, the olfactory tracts and bulbs, the optic tracts and commissure, the mammillary bodies, the crus cerebri, pons and medulla, together with the apparent origin of all of the cranial trunks in order as indicated in this chapter.

of the feetward part of the head, up to the vertex and into the temporal regions at the side, and feetward to the region of the thorax, both ventral and dorsal. This arrangement is called the cervical, somatic plexus, and includes the first, second, third and fourth pairs of trunks.

Nerves from fifth, sixth, seventh, and eighth cervical, and first and second thoracic trunks, compose what is called the brachial plexus, and being rearranged in the axilla of each side, ramify the thorax dorsally and ventrally, and furnish the entire ramification to the shoulders, arms, forearms, wrists, hands and fingers.

The ramification of the dorsal and lateral, primary divisions of the thoracic, intervertebral nerve trunks, have been indi-

cated. They ramify the trunk in rings, as it were, obliquely dorso-ventrally. These series interlap over the whole trunk. This arrangement is continuous and without exception to the lumbar trunks; there the scheme indicated is partly carried out sufficient to supply the wall of the trunk, but other nerve trunks are rearranged for extension to the lower extremities, and these make up the lumbo-sacral, somatic plexus, through the medium of which the thighs, legs, ankles, feet and toes are ramified.

CHAPTER NO. 24

Physiologic Analysis of Nerve System

IN this chapter the Brain and Nerves will be discussed together.

Anatomy teaches that the difference between brain and nerve tissue consists in the shape of the cells. In the brain the cells are nearly round while those in the nerves are elongated, forming what is called the gray axis cylinders. Nerves begin at brain cells, in gray axis cylinders and extend from that point to their terminal cells, which are in relation with the tissue elements to be stimulated.

Nerve stimulus is an original, elemental energy. It is not manufactured, generated, or composed, but has a continuous, non-varying, eternal existence, not differing in that respect from other phases of force. However, its origin is from the source of animation, and is as bountiful as electricity, although in no sense similar.

Nerve stimulus is an intelligent energy transmitted through the Soul of the individual, directly from the central intelligence of the universe, or Creator.

The most important function of brain cells is to receive, by what process can only be conjectured, this elemental, original energy, and convey it into certain channels, the nerves, that transmit it to every atom of the organism.

Another important function of the brain is the production of Mind, which, so far as can be ascertained, is a direct emanation or implantation from this original or kenetic energy. Physiologically, it is known that Mind exists, as a result of the peculiar functioning of certain brain cells, but just how that function is performed must, in all probability forever

remain undiscovered. It is, however, well known that Mind function, no matter how accomplished, is performed under the direct influence of nerve stimulus.

It is the function of the nerves to receive the stimulus from the brain, and convey it to many ganglionic points throughout the body, and from thence to the cell elements of the entire organism.

Nerve trunks are usually spoken of by anatomists and physiologists as nerves.

A nerve is a single thread, beginning at a cortical cell, in the brain, and ending in relation with cells in tissue.

A nerve is composed of a jelly-like, protoplasmic substance, and is covered with *neuroglia*, or nerve paste, which is a protection, and also an insulation, so that each single nerve conveys its stimulus without interference, throughout its entire length, when in normal condition.

When two or more nerves are enclosed in neuroglia, or any form of nerve covering, they constitute a fasciculus, or trunk.

¶ When a fasciculus of nerves are enclosed in myelin or the white substance, they constitute a medullated trunk; but a single fasciculus or a nerve trunk may be medullated, or non-medullated ☙ ☙

In nerve trunks the fasciculi or bundles are not only separated from each other by neuroglia, but by septa given off from the *epineurium*, which is the sheath of the nerve trunk.

The nerves of a fasciculus are separated by neuroglia and supported and bound together by a delicate connective tissue called *endoneurium*. The tubular sheath of a nerve trunk is called *neurilemma*.

Ganglia are aggregations of nerve cells at certain parts of the organism, each ganglion cell being individual to its nerve. Ganglia act as reservoirs of nerve stimulus. The function of a ganglion is to supply, at times of emergency, their stored stimulus for immediate local use.

The great ganglia of the organism are, therefore, placed at places where most effective, when such emergencies occur, which centers will be referred to particularly in the physiology of the various organs.

Nerves are also described as constituting plexuses at different parts of the system.

A nerve plexus is a concentration and network of nerves, for rearrangement, and for the formation of new trunks, in which they are to further extend.

A nerve plexus, must be carefully distinguished from a nerve trunk plexus, for they are wholly different. A nerve plexus being a network of rearranging nerves, while a trunk plexus is a network of rearranging nerve trunks.

A nerve may extend through several ganglia and plexuses before reaching the area to be stimulated. Nerve plexuses and ganglia always occur together.

Stimulation, or delivery of nerve stimulus to cell elements of the body is not accomplished, by the nerve carrying the force into the cell; but is accomplished by the process of transmission of stimulus from the bare terminal cell of the nerve to the tissue cell elements, the process requiring relationship, within a certain distance. Nerves are all bare gray cells at the ends, and in case of stimulation of the contents of vessels, the distance may be considerable.

Sufficient has been said to make it clear that the brain is not only the principal organ of every function of the body, but is the primary organ of the body, and that while the brain must rely for the maintenance of its structure upon the ordinary processes of nutrition, yet that process has nothing to do with the principal function of the brain—that of receiving the original, elemental energy that causes all animation.

Nerves are only of slightly less importance than the brain, and from a functional standpoint of no less importance, for the reception of stimulus would be valueless without transmission and application, and these depend upon the nerves.

The physiology of the tissues of the brain and nerve system will be apparent after the development of the various processes of nutrition, which will be found to begin with the digestive system.

In passing, however, it can not be too deeply impressed that the tissues, of the brain and nerves, are to all intents and purposes like those of any other structure, and receive their

nutriment from the same processes, as do other classes of tissue ☙ ☙

One physiologic law of the tissues of the brain and nerves must be noticed at this time. It is a law that is general in its application to tissue; and is that the more highly refined and delicate a tissue is, the greater the per cent of water entering into its composition. In some parts of the nerve system this amounts to some ninety per cent, in others eighty-three per cent, and in ordinary nerve tissue about eighty per cent.

CHAPTER NO. 25

Physiologic Analysis of Alimentation

ANATOMIC SYNOPSIS

THE digestive system is composed of a *Principal Part*, which contains or is directly engaged in the conduct of substances introduced as food through it; and an *Accessory Portion*, which furnishes some aid to the process called Digestion, but does not come in contact with the contained or passing substances.

The principal part of the digestive apparatus is an irregular tube, extending from the lips to the anus, called the Alimentary Canal, because it is the tube in which the aliment or food is conducted while undergoing its various processes, and from which its surplusage and residue is finally eliminated from the body.

The accessory part of the digestive apparatus is composed of the salivary glands at the mouth; the gastric glands at the stomach, and the spleen, liver and pancreas at the small intestine.

The alimentary canal is about thirty feet in length and is divided for convenience of description into the *mouth*, *pharynx*, *esophagus*, *stomach* and *intestine*.

PHYSIOLOGIC ANALYSIS

Digestion consists of all the various functions by which substances used as food are prepared to be absorbed. Its primary step, therefore, is that termed *Ingestion*, which consists of taking substances for food into the body.

So far as known, there are three digestive locations in the

alimentary canal; the mouth, the stomach, and the small intestine ☙ ☙

Each place is either directly in relation with the accessory organs which aid in its office, or in relation with a part of their machinery. These are: At the mouth, the ducts of the salivary glands; at the stomach, the gastric glands, which, by this reasoning, are accessory; and at the small intestine, the duct from the liver, which organ receives accessory contribution from the spleen through the splenic vein, and from the pancreas through the pancreatic duct.

The parts of the alimentary canal, between and beyond the digestive points mentioned, are primarily conducting tubes, but from the beginning of the small intestine, there is a constant absorption from the contents.

The substances, beyond the digestive points, called feces, are largely eliminated from the body, as being unfit for further use in its economy, but it must be noted that much by-product lymph is absorbed here.

Analytical chemists by consensus of opinion, have declared that the chemical formula of the human body is approximately: Oxygen 72, hydrogen 9.10, nitrogen 2.5, carbon 13.50, phosphorus 1.15, calcium 1.30, sulphur .147, sodium .10, potassium .026, chlorin, .085. Traces in small and variable amounts of fluorin, iron, magnesium and silicon, with evidences of others not isolated.

Of course the formula given, is not pretended to be correct, but is only an approximation induced from many analyses. ¶ It will be understood that the combination and elaboration of the chemicals named, with others not yet known; and certain elements which are incapable of isolation, constitute an always varying compound which it is the office of certain functions, later to be described, to elaborate and use, looking to the necessities of the organism at the given time.

As multitudinous as are the combinations of these original chemicals, with others not known, which can not even be conceived or approximated; the organism is possessed of the power, under normal conditions, to produce elaborations necessary to equilibrium and to its existence, growth and health ☙

It is the primary office of the digestive system to properly prepare substances, taken into the body as food, in such a manner that its chemical elements shall be freed, elaborated, and brought to such consistence as to be absorbable by the organs having charge of that function, which are the *villi* of the small intestine, and the lymph glands generally of the entire intestinal tract.

The physiology of absorption and its object will be fully described, as an incident to liquid movement, but at this time, in passing, it can not be too deeply impressed that preparation for absorption is the primary object of digestion, and that absorption is the primary office to nutrition.

Physiologists have always placed much emphasis upon the proposition that the mouth is the organ with which we eat; the mouth is only the first organ of ingestion, and that properly considered, the organism eats through its intestinal absorbents. ¶ It must also be remembered that many substances are taken into the liquids of the body through the absorbents, that can not enter into the economy of the body and, therefore, are only substances for elimination.

Since it is to furnish to the absorbents of the alimentary tube the chemicals necessary to material existence, that digestion is performed, it will be seen that those substances, other things being equal, which contain the greatest number of original chemical elements of which the organism is composed, so contained as to be easily freed, are the best substances for food, and such combination of substances, as to reach the same chemical result or formula, is next in order. To secure these conditions, however, it will be found necessary to make radical changes in the substances used for food often, being careful not to mingle substances containing uncongenial or antagonistic chemicals at the same time. It must, however, be understood that there is no positive law as to food selection that can be laid down. As to food selection, each individual is a law unto himself, and the law will be found to inhere, in his ever varying physical economic needs, and the ability of his digestive and absorptive processes to meet the requirements.

What is food to one person may not be food to another, but by adverse chemical combination constitute a poison.

A substance that will meet with congenial conditions throughout the digestive parts of one system, may meet with antagonistic conditions throughout those parts, of another system, both of which are considered to be in normal condition ☙ Therefore, the selection of food must always be made, at best, as an advised guess, the advices arising from the experiences of the individual relative to eating.

Eating is a process of medication, as well as nutrition, and must bear its share of dangers from error, which luckily are reduced to the minimum in the careful, because food products are not concentrated, as are the substances known to Materia Medica ☙ ☙

There are certain attitudes that enter into, and largely control digestion, which must not be overlooked at any point of the process. Anger, sorrow, mental excitement, fear, etc., render the machinery incapable of digestion, for reasons to be described, in connection with the physiology of such organs. ¶ Therefore, no matter how erroneous the selection of an article for food may be, if it is going to be ingested, it should be taken without fear and it should not be feared after it has been swallowed.

Many dietetic mistakes are made with relation to the various emotions, which it is impossible to describe and illustrate in this connection; but it will be sufficient to say, that one should not eat when emotionized, or while performing mental labor. The practice, therefore, of carrying on active, brilliant, or witty conversation at table, such as society requires, very much retards digestion.

The proper attitude for the act of eating is entire passivity, so far as the emotions are concerned, with the whole mind forces, such as are active, centered upon the act of eating. It is very injurious and very considerably retards digestion to permit the Mind to be diverted from a keen, concentrated enjoyment of the viands, during the process of eating.

From what has been said of food, it follows that water is really the leading food product, since it is the quickest and readiest

means, aside from the lungs, of conveying to the body the chemicals of which it is composed. Water is mentioned in this connection because it has not heretofore been considered as a food product. All other substances for food, will be found to be largely composed of water, with other incidental substances ☙ ☙

Another function performed under the influence of intuition is worthy of specific mention, not to say prominence, and that is the flow, at the proper time, of the so-called digestive juices; especially those of the salivary and gastric glands, as well as those of the spleen, liver and pancreas.

The digestive glands, in their normal condition, when digestion is not going on, do not excrete or discharge their various digestive substances. It is true, there is a constant moistening of the mucous lining of the alimentary canal, but this is accomplished by the mucous glands.

Immediately upon taking food into the mouth, or indeed, on coming in contact with the odor of viands, preparatory to eating, the various digestive glands become active, and upon taking food begin to discharge their liquids copiously; but however, in just sufficient amounts to accommodate the necessities of the occasion. When the process performed by each organ has been finished the juice from it ceases to flow.

¶ In this connection, it must be called to the attention of the student that the process of digestion is continuous until the ingested substance has passed through the three locations of the canal already mentioned.

The admixture of the chemicals of the food, with the chemicals from the glands, in each of the three locations, aids in digestion, and the final admixture in the small intestine of the whole, which of course, contains the three separate elaborations, finally makes up the sum total and is digestion; the digested substance being called *chyle*.

CHAPTER NO. 26

Digestion—Mouth

ANATOMIC SYNOPSIS

THE mouth is the cavity, behind the lips and in front of the pillars of the fauces, and between the cheeks. It consists of two departments, the *vestibule*, outside of the teeth, and the *oral cavity*, within the embrace of the rami of the mandible.

The digestive machinery of the mouth, is the teeth and the tongue. There are two sets of teeth, the temporary and permanent. The tongue has three sets of taste buds: 1, conical; 2, fungiform; and 3, circumvallate. It is an organ of taste and mastication.

The accessory glands of the mouth are the six salivary, arranged in three pairs, the *parotid*, the *submaxillary*, and the *sublingual*. The parotids discharging their excretion into the vestibule, opposite the second molar tooth of the headward jaw, while the other two discharge, on the floor of the mouth, at the sides of the tongue. In addition to these there are the mucous glands, of the lining membrane of the mouth.

¶ The mouth opens dorsalward, through the isthmus of the fauces, into the *oral pharynx*, then feetward into the *laryngeal pharynx* and from that into the *esophagus*, which leads to the stomach.

Nerves—The mouth is chiefly ramified by the pharyngeal branch of the superior maxillary division of the tri-facial, the lingual branch of the inferior maxillary division, the glossopharyngeal, the hypoglossal, with contributions from the pneumogastric and the so-called sympathetic, also from the third and fourth thoracic and first and second cervical trunks.

Two processes are included in mouth digestion; the first *mastication*, and the second, *insalivation*.

Mastication is the process by which food products are manipulated by the mouth, including incising it from other substances where that function is necessary.

The process of mastication consists in grinding the food between the teeth, against which it is held by the lips, cheeks, gums and tongue, and by the manipulations of the tongue, it is carried from side to side of the mouth, projected into the vestibule, and brought back into the mouth proper, with the aid of the muscles of the cheeks and labial folds.

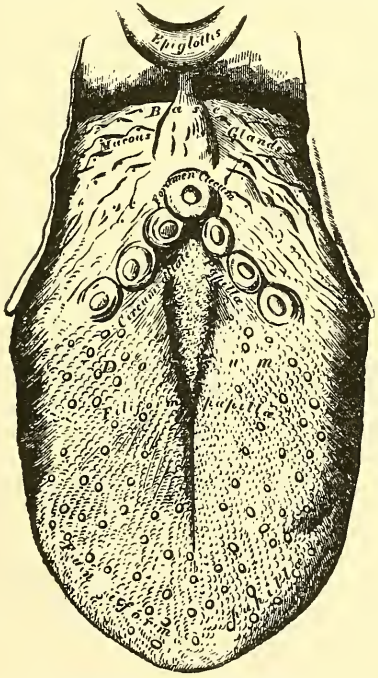


FIG. 15—TONGUE AND PAPILLAE
The *sulcus terminalis* surrounded by the *circumvallate papillae*, next *filliform papillae* and finally *fungiform papillae*.

This process of mixing is not performed by itself, but is materially aided by the saliva, which is, by the process just

described, thoroughly admixed with the food, which is called Insalivation ☙ ☙

The saliva is obtained from the salivary glands, and certain incidental glands of the same character, the principal saliva reaching the mouth through the several ducts described in the anatomy of salivary glands.

Saliva is a transparent lymphoid fluid with a specific gravity of 103 to 105, having usually an alkaline reaction. It will be at once understood, however, that saliva, on being discharged from the duct of each gland, is at once admixed with that from the other glands, as well as that from the mucous glands, which is also discharged into the mouth, so that without mechanical interference it is impossible to get pure saliva ☙

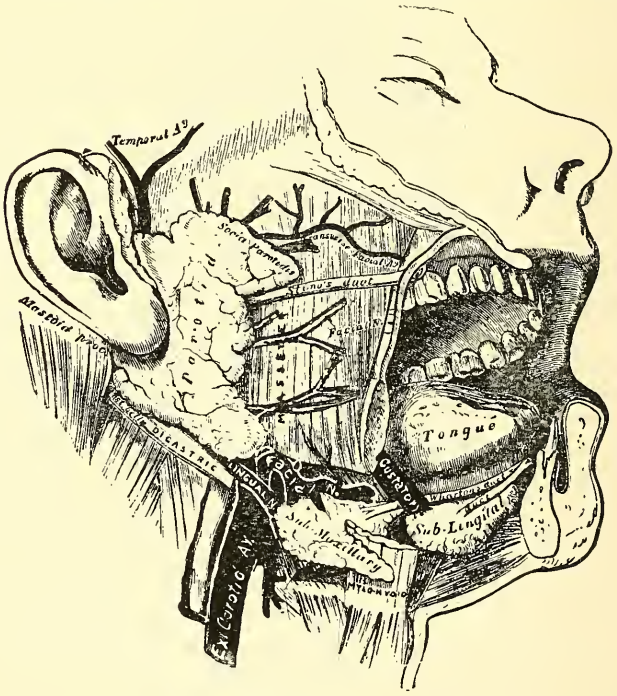


Fig. 16—Salivary Glands

The student will note that, the cut shows the right parotid, the right sub-maxillary and sub-lingual glands practically in situ. A right portion of the mandible has been removed. The sub-maxillary gland is pushed down to show its arterial supply; to bring it to situ, it should be turned up so as to hide the artery.

To obtain saliva by mechanical interference is to produce excitement, changing the consistency of saliva, so that it is impossible to obtain normal saliva for examination, and if it could be done, it will at once be seen that an analysis of it, could only be made of morbid substance, after the life element had escaped, or in other words, after all those elements, which constitute the difference between living and dead saliva, had passed from it.

So that an analysis of saliva could not be correct, and could in no sense be a guide, to its consistency as an animate substance, and could rise no higher in value than, an unsatisfactory approximation.

However, physiologists have professed to analyze saliva and say that it consists of 994.1% water, with 5.9% solids, in which they claim to have isolated ten distinct chemicals, in varying parts, which are not quoted here, because any analysis of saliva, for the reasons stated, is not sufficiently reliable to be of value.

However, the fact remains that saliva does contain certain chemical elements which are not found at other points in the digestive tract.

Saliva is a constantly varying fluid, the saliva of each individual depending for its consistency upon the condition of that organism, at a given time; and it is well known that the chemistry of the organism is constantly varying.

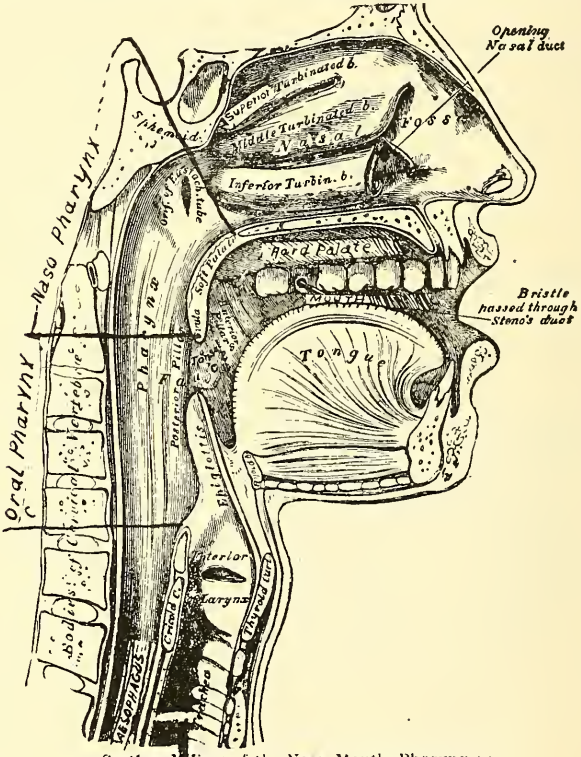
It is, therefore, quite impossible to state, just what effect the admixture of saliva has upon the food. It is probable that it has a markedly varying effect, since we know that it is sometimes *alkaline*, and sometimes *acid* in its reaction, which could not be true if its reaction upon food was always the same ☙

It has been found, however, that in its varying conditions it is a necessary element to proper digestion, the mingling of its water and chemical parts, with the chemical elements of food, being absolutely necessary, to prepare food for further elaboration in the stomach. It is probably true that the most important effect of saliva upon food is its solvent and diluent quality ☙ ☙

The statement usually made by physiologists, that the

reaction of saliva converts starch into sugar, is not reliable. It may do so, but must not be relied upon as being in any sense, always true.

It will be remembered that the ducts from the parotid gland, Stenson's, discharge on each side into the mouth in the upper part of the vestibule from the wall of the cheek opposite the second molar tooth. This will be observed to be immediately above the grinding teeth of the upper and lower jaws.



Sectional View of the Nose, Mouth, Pharynx, etc.

FIG. 17—MOUTH, PHARYNX AND ESOPHAGUS

It will be noted that lines are drawn, to schematically illustrate, the separation of the pharynx in the order from above downward. The left side of the larynx and epiglottis are also shown.

It will also be remembered that the ducts from the Submaxillary and Sublingual glands discharge upon the floor of

the mouth at each side of the *fraenum linguae*, which is inside the walls of the mandible, and immediately below the grinding teeth of the jaws.

It will be seen that the salivary glands are so situated that each movement of the tongue from the median line toward the jaw, forces the saliva from below upward into the grinding process, and that each contraction of the muscles of the cheek, forces saliva from above downward, into the grinding process. ¶ These liquids are augmented by that from the incidental salivary glands, and a large number of mucous glands situated in the lining of the mouth. ¶ The process of *insalivation* is slighted, through ignorance, by the great majority, who rarely *masticate* their food, properly speaking, at all, or but little, and force it down by the use of liquids.

No liquid should be taken into the mouth while there is food substances therein, that require mastication. Primarily, because to do so aborts the process of insalivation, and secondly because to furnish such artificial aid to mastication, is to artificially perform a function for the salivary glands, which will soon result in those organs failing to perform that function normally when relied upon to do so, following the law, that applies equally to all parts of the body, that inactivity or lack of proper exercise results in loss of power ☙ The process of insalivation, from the mechanical aspect, should be continued until starchy food substances, in the mouth are of the consistency, generally speaking, of paste. This, of course, referring to solid foods.

Meats require much less mastication, the rule being that the finer the meat the more it must be chewed. Coarse meat, like beef, needs very little chewing, it is usually over-masticated. Liquid food, if taken at all, should be retained in the mouth and moved about by the tongue, until it has had an opportunity to be thoroughly admixed with saliva.

When food has been properly masticated in either event, it should be deglutited, a process which is performed principally by the tongue, aided somewhat by the relative muscles of the mouth. ¶ Deglutition consists in passing the food dorsalward from the mouth into the pharynx.

CHAPTER NO. 27

Digestion—Stomach

ANATOMIC SYNOPSIS

THE stomach is the most dilated portion of the alimentary canal. It has a *fundus*, *body*, and *pyloric portions*. ¶ The stomach is a somewhat pear-shaped organ, flattened on the ventral and dorsal aspects, and is from eight to

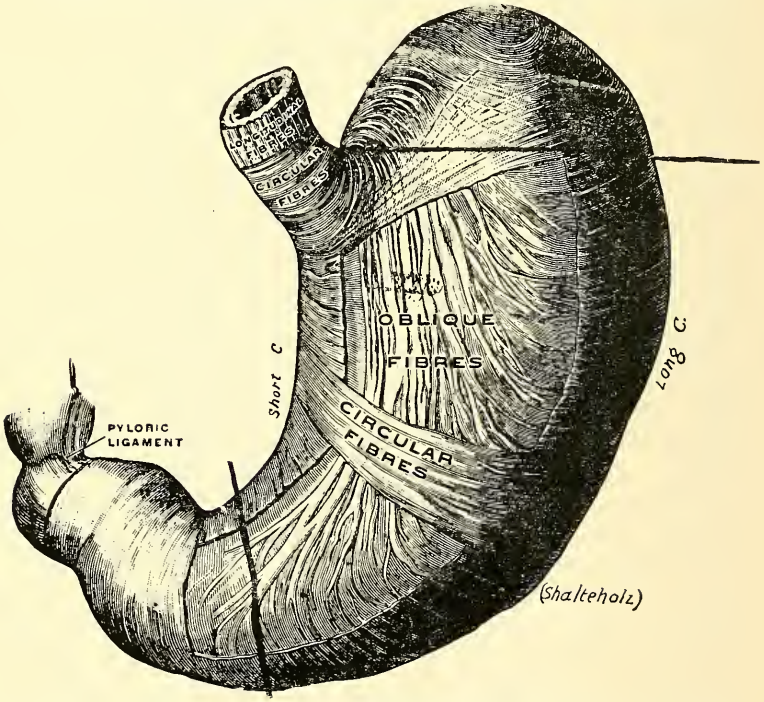


FIG. 18—STOMACH, SHOWING MUSCULAR COATS
This is a good cut. The student should note the short curvature and long curvature as indicated. The fundus is that portion headward to the line drawn from the cardia across. The body lies between that and the next line and the pyloric antrum is the remainder of the stomach.

twelve inches long, and is the link of connection, between the esophagus and duodenum. Its orifices are, the *cardiac* and *pyloric*, both of which are closed by sphincters.

The wall of the stomach is composed of six coats, which from the outside are; the serous, the longitudinal muscular layer, the circular muscular layer, the oblique muscular layer, the submucous layer, and the mucous lining.

The glands of the stomach are the Cardiac and Pyloric, which are large mucous glands; the common mucous gland, and the true Gastric glands.

Nerves—The stomach is ramified principally by nerves from the fourth thoracic trunks, but also by nerves from the fifth and a few nerves from the third thoracic trunks. Also from the pneumogastric trunks and contributions from the vertebral accessory and phrenic.

PHYSIOLOGIC ANALYSIS

After deglutition the food passes through the pharynx and esophagus, receiving from the mucous membrane of these tubes mucous fluids, with which it intermingles. At the termination of the esophagus it passes through the cardiac orifice into the stomach; which is but a dilation or pouch to contain the food during stomach digestion.

Liquid substances taken for food pass directly along the short curvature of the stomach to the pyloric portion of the stomach; through the pyloric orifice of which, they are soon discharged into the intestine.

That portion of food classified as solid, is retained in the stomach, occupying the body and fundus. At the conclusion of ingestion the sphincters of the cardiac orifice, as well as of the pyloric orifice, contract, closing the stomach, after which a muscular operation, somewhat analogous to that by which food was propelled through the esophagus, called *peristalsis*, begins ☙ ☙

The three layers of muscular fibres of the stomach contracting and relaxing alternately cause the food substances in the stomach to be carried around the walls of the stomach, being

turned over and over, so that each part is thoroughly intermingled with all other parts, the external surface of the contained mass being constantly kept in contact with the mucous wall of the stomach over the fundus and body in such way as to receive the juices from the gastric and mucous glands &c. The process is seen to resemble very considerably that of an old fashioned churn. As the parts are thus intermingled, those more easily soluble soonest become liquid and ready for passage into the intestine. These substances, by reason of the peculiar muscular arrangement, movement, and form of the stomach, are carried into the pyloric portion, from which, when accumulated in sufficient quantity, that the pyloric orifice opens, they are discharged into the intestine, after which that orifice closes again.

The stomach continues this operation until all of the substances possible to be reduced to liquid have been so reduced, and passed through the pylorus into the intestine. This process usually requires two or three hours.

In this connection, reference is necessary to the power the stomach has of freeing itself, through the channel described, of substances of considerable size which do not become liquid by its manipulations. The reference is to the resistant skins or coverings of many fruits and vegetables; also to marbles, buttons, pieces of money, etc., that are sometimes swallowed. These must await the passage of substances reducible, and then are passed when the stomach entirely reduces its cavity.

¶ The gastric juice is a composite fluid, principally derived from the so-called true gastric, cardiac and pyloric glands, and a large number of other glands, situated generally over the mucous membrane of the stomach.

There have been many attempts to secure chemical analysis of gastric juice, but like saliva, it is a constantly changing substance; normal when the organism is normal, abnormal at other times; and since there is no standard of normality, there is no standard of consistence of this juice.

Most physiologists now base their analysis, upon certain experiments made by Beaumont upon a man named St. Martin, in whose stomach there existed, as the result of a

gun shot wound, an opening leading directly into the stomach near its upper part, about three inches from the cardiac orifice ❧ ❧

In describing the process, Kirke says that the introduction of any mechanical instrument, as the bulb of a thermometer, into the stomach through this opening, " at once excited the secretion of gastric fluid," which was drawn off, and from it analysis was made.

Other experiments have been tried through fistulas, and it is upon the analyses of morbid gastric juice made after this manner that we must depend for any knowledge of that subject ❧ ❧

These very unreliable analyses have been given to us, by physiologists as being correct, and the proportionate per cent of chemicals of each substance as being correct component parts, of gastric juice, entirely overlooking the fact that gastric liquid discharged on account of excitement, such as mechanical irritation or otherwise, would of necessity produce abnormal juice and also overlooking the fact, that the juices exuded from the walls of a wounded stomach would not be normal, and that mechanical interference necessary, to draw off the liquid, would result in its abnormality.

But last and most important of all, even if the normal liquid could be obtained, it would be inanimate when analyzed, and its chemistry changed, having lost those substances which constitute the difference between animate and inanimate gastric juice.

The juices of the alimentary canal have all been analyzed and their constituents announced, by the devotees of internal medicine, for the purpose of deceiving the laity into a belief in the value of internal medicine.

Devotees of medicine hope that some day they may reach such knowledge of chemical consistence as to enable them to intermingle medical chemicals with the juices and foods in the stomach advantageously, and with certainty of results, which has not, and will not be attained.

The so-called standard analysis, made as indicated, declares that, in the gastric juice of the human stomach, there are

994.4 parts water, with 5.6 parts solids; the solids being classified as consisting of pepsin and free hydrochloric acid, and containing calcium, sodium, potassium, magnesium and iron phosphates.

However unreliable the figures just given may be, it is true that the cells in the wall of the stomach, excrete much water containing a diversity of chemical elements, which constitute an ever changing formula, exerting a marked influence upon the substances for digestion in the stomach. Just what these influences are, or how they are accomplished, is unknown ☙ It is known, that the result of such intermingling is the reduction of the food solids into liquid, and the admixture of the chemicals of the gastric juices with those of the food in such manner as to produce a substance ordinarily milky in color, depending somewhat upon the coloring matter of the foods eaten, and about the density of cream, called *chyme.*

The stomach may, therefore, be said to be a laboratory for the admixture of its juices with the food, the muscular manipulation aiding materially in that operation.

Chyme is not a digested substance, but is a chemically elaborated substance, ready for further processes of digestion in the small intestine. The quantity of gastric juice excreted daily, of course, can only be approximated. It varies remarkably, with the condition of the individual, but in the average adult, it may be said to vary from ten to twenty pints each twenty-four hours.

Proper digestion in the stomach is facilitated by the taking of a considerable portion of water at eating times. This, however, should never be taken when there is solid food in the mouth, and indeed, the better time to take the liquid is after finishing the solids at the close of the meal, and just before retiring from the table.

Sufficient liquid should be taken following the meal, that the individual need not drink again, within two or three hours, to the end that when the stomach has closed its orifices, and commenced its process of digestion, it need not be interrupted and that process stopped and its normality largely, if not entirely destroyed, by taking liquids into the stomach. Of

course this applies to taking anything into the stomach at such times.

Vomiting is not a part of digestion, but since it is a phenomenon largely of the stomach, it need only be said that it is performed by *reversed peristalsis*, beginning with the walls of the stomach, accelerated and aided by the violent contraction of the muscles of the abdomen, lessening that cavity headwardly and thus forcing the stomach violently against the rigid diaphragm.

CHAPTER NO. 28

Digestion—Small Intestine

ANATOMIC SYNOPSIS

THE small intestine begins at the pyloric orifice of the stomach and ends at the ileo-cecal orifice, where it extends into the large intestine. It is about twenty feet in length, beginning with a diameter of about two inches, and ending with a diameter of one inch.

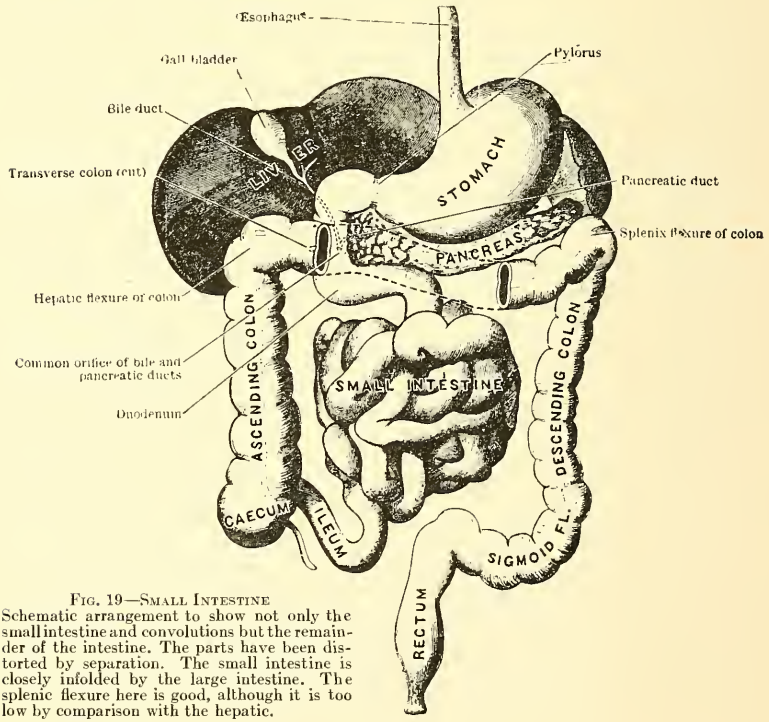


FIG. 19—SMALL INTESTINE
Schematic arrangement to show not only the small intestine and convolutions but the remainder of the intestine. The parts have been distorted by separation. The small intestine is closely infolded by the large intestine. The splenic flexure here is good, although it is too low by comparison with the hepatic.

The small gut is in three divisions; *duodenum*, the length of the width of twelve fingers, about ten inches; the *jejunum*, arbitrarily eight feet long, and the *ileum*, the rest of the gut, about twelve feet. Five layers of tissue compose its walls, which from the outside are; the serous covering, the longitudinal muscular layer, the circular muscular layer, the submucous layer, including the *muscularis mucosae*, and the mucous lining. The mucous lining is in shelf-like invaginations called, *valvulae conniventes*, which retard substances in their passage.

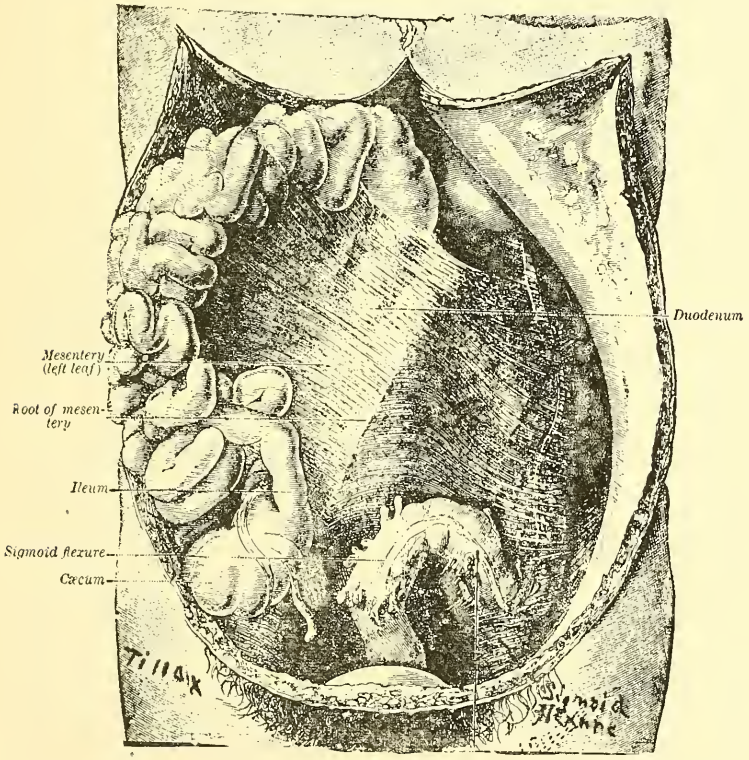


FIG. 20—ROOT OF MESENTERY
The small intestine is here gathered up and lifted headward and to the right so as to show, the line of reflection of the peritoneum, from the dorsal abdominal wall, from a point to the left of the second lumbar, obliquely down across to the right inguinal fossa. This is called the *mesentery*.

The absorbents of the small intestine are: the villi, which are food substance absorbers, the simple follicles, the solitary glands, which are large lymph glands, and Pyer's patches, which are only aggregations of solitary glands. The mucous glands of the intestine are: Brunner's glands, which are found in the duodenum, and the common mucous glands, which are found quite thickly, in the mucous lining, of the whole gut.

The small gut is retained to the dorsal abdominal wall, by folds of membrane called, the mesentery, between the layers of which, the nerves and arteries extend to supply the intestine, and the lymph vessels and veins extend away from the intestine.

Nerves—The small intestine is principally ramified by nerves derived from the fourth, fifth, sixth, seventh, and eighth pairs of thoracic trunks, which reach the *solar plexus* through the great splanchnic trunks, there being rearranged, and ramifying the various parts of the intestine as follows: The duodenum, principally from the fourth to the sixth pairs inclusive; the jejunum and ileum from the sixth to eighth pairs inclusive. Some of the lower convolutions, of both are ramified from the trunks further down, including the second lumbar pair.

THE SPLEEN

is accessory to the liver, and is the largest ductless gland. It is about five inches in length, three in width, and one inch in thickness, and lies in relation with the dorso-headward aspect of the stomach.

The spleen is rich in lymph glands and vessels, and is capable of containing much lymph and blood, for its size. The Splenic Vein is the largest radicle of the Portal Vein of the liver ☙ ☙

Nerves—The nerves, which ramify the spleen, are derived from the sixth, seventh, eighth and ninth thoracic trunks. They are conveyed through the great splanchnic trunks to the *solar plexus*, and there rearranged, entering the spleen through its hilum.

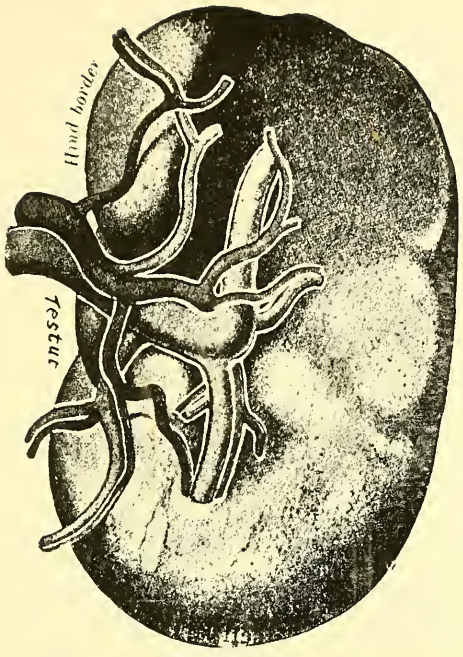


Fig. 21—Spleen
Cut shows gastric and renal surfaces, also shows the hilum—the splenic artery and its divisions, entering the substance of the spleen and the splenic veins, emerging from the substance of the spleen and converging to form the splenic vein.

THE LIVER

is the largest ductile gland in the body. It lies under the diaphragm, in the right hypochondriac region, extending to the left nearly across the headward part of the epigastric region. It has a right and left lobe, and is covered with serous membrane, except where it lies in relation with the diaphragm. Under the serous coat, it has a fibrous coat, which at its hilum is called the *Capsule of Glisson*, which enters the liver substance and aids in forming the *portal canals* ☙ Through the hilum of the liver, called the transverse fissure, the nerve trunks, portal vein, and artery extend, into its substance, and the hepatic duct, extends out of it. The liver, like all glands has a cortex and medullary center, its specific gravity is 1.05. It is a soft-solid, friable and easily lacerated.

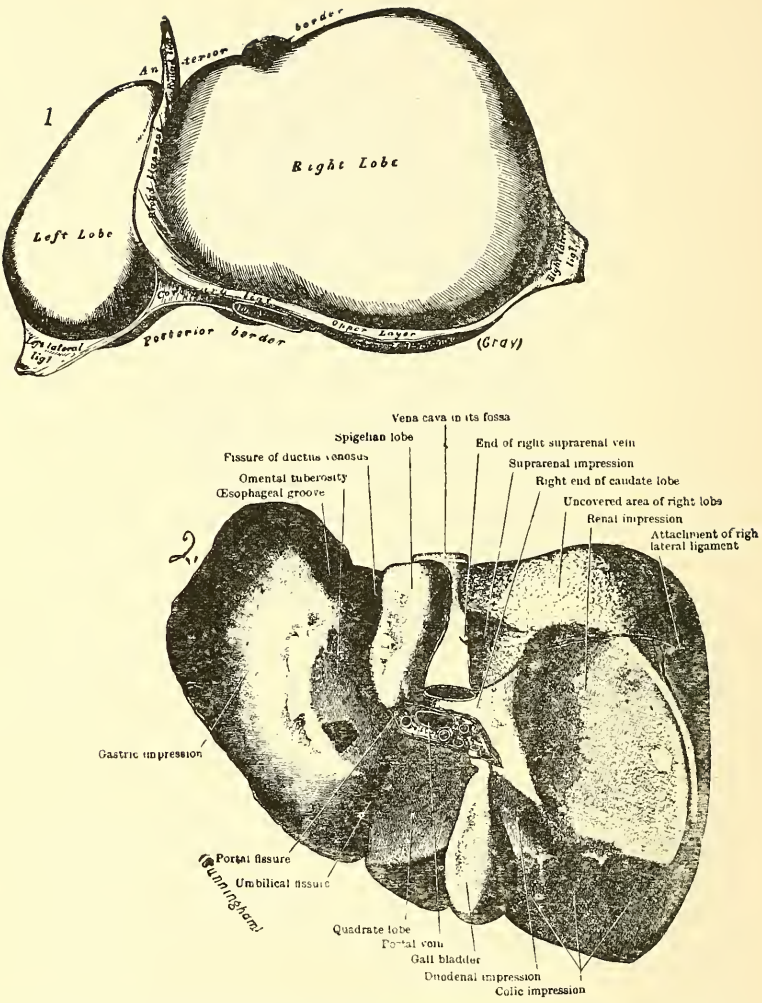


Fig. 22—Headward and Feetward Surfaces of Liver
1, Headward surface looked at from behind, showing lobes and ligaments; 2, Shows feetward surface tipped up from the dorsum, showing the uncovered area—transverse fissure—bladder—lobes—impressions and fissures.

Nerves—The whole substance of the liver is very richly ramified by nerves which, generally speaking, follow the vessels of liquid movement. They are derived from the fifth,

sixth, seventh and eighth pairs of thoracic trunks, which, contributing to the great splanchnic trunks on each side, reach the solar plexus, and are there rearranged and extend to and ramify the liver, entering its substance at the transverse fissure. It also receives a ramification from the pneumogastric and phrenic trunks, but principally from the fifth, sixth, and seventh thoracic trunks.

THE PANCREAS

is a compound, racemose gland, much like the salivary, only much softer, and less compactly arranged. It is placed dorsal, to the feetward part of the stomach, and extends from the right side of the vertebral column, across it to the left, a distance of from, five to six inches, its breadth is about an inch and a half, and its thickness about one inch. It is irreg-

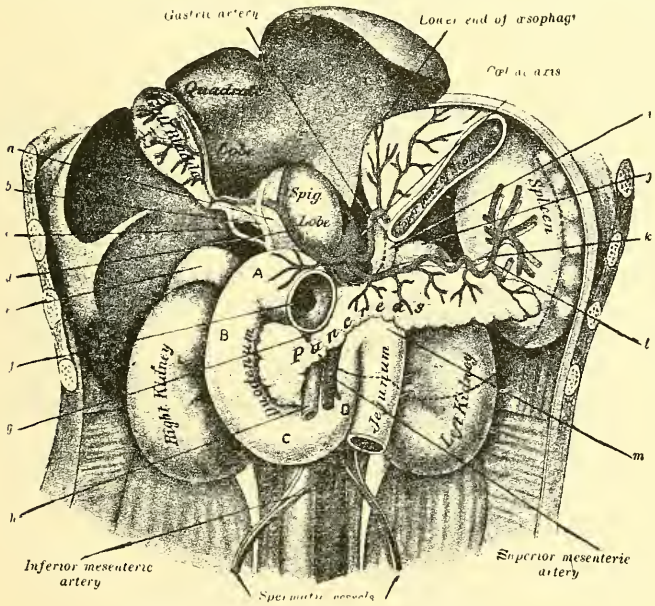


FIG. 23—DUODENUM, PANCREAS AND SPLEEN
The student's attention is especially called to the pyloric sphincter, as indicated; also to the *duodeno-jejunal* flexure—note carefully the sharpness of its angle.
In looking at this picture, the student should remember that if the liver were turned feetward to normal position it would entirely hide the kidney and most of the duodenum and bring the gall bladder so that it would rest between the kidney and duodenum as indicated.

ularly prismatic in shape. Its head extends to the right of the duodenum in the curve of which, is its neck. The tail of the pancreas lies in relation with the spleen. Its duct, the canal of Wirsung, begins in its tail, and extends through its length, ending at the intestine.

Nerves—The pancreas is principally ramified by nerves from the sixth, seventh and eighth pairs of thoracic trunks, which reach the solar plexus through the great splanchnic trunks, and thence, after rearrangement, extend to and ramify the pancreas ❧ ❧

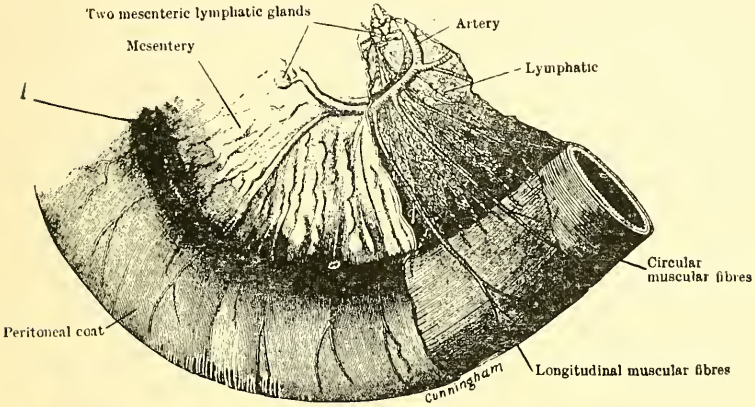
PHYSIOLOGIC ANALYSIS

Intestinal digestion is performed in that part of the alimentary canal between the pyloric orifice and the ileo-cecal valve ❧ As will be remembered, this is a peculiarly constructed tube about twenty feet in length. The digestive function is very largely performed in the duodenum and upper third of the jejunum. However, it may be well conceived that the process continues throughout the whole tube.

During the active process of digestion, not only is the pyloric orifice closed, but the ileo-cecal valve, is closed, completing a very remarkable compartment of the alimentary canal, to retain food properties entering it, from the stomach as chyme, until the digestive office has been performed, and also until absorption has had opportunity to take place. These processes normally require from three to five hours. ¶ The construction of the inner surface of the tube aids very materially in the retention of the substances to give time for the digestive process.

Reference here is to the *valvulae conniventes*, which are described in the chapter on the anatomy of the small intestine. It will be found that those valve-like structures are so arranged, that during the process of digestion, the contents are moved spirally around the wall of the intestine, being pressed closely against the surface of its lining membrane, thus bringing it directly in contact with the orifices of the absorbents, and also in contact with the composite, digestive

substances discharged into the tube from the spleen and liver through the bile duct, and from the pancreas through the pancreatic duct, and from the mucous glands of the intestinal wall.



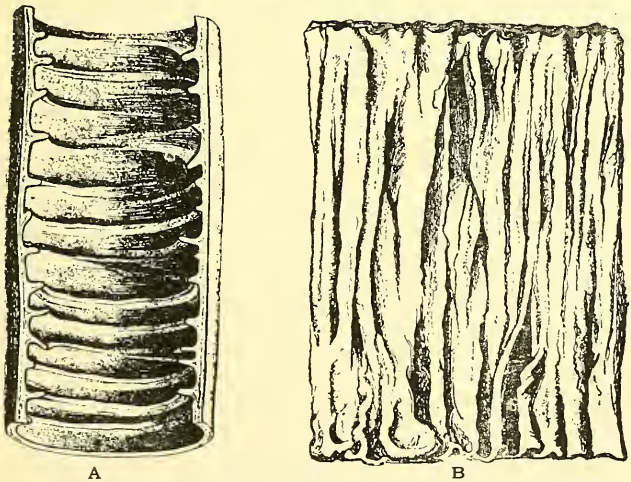


FIG. 24—ARRANGEMENT OF THE MESENTERY AND VALVULAE CONNIVENTES

1, The larger portion of a convolution of small intestine is shown, a portion of it covered by the mesentery entire. To the right there is a portion from which the mesentery or serous coat, as to the ventral layer, is removed, showing the arteries, veins and lymph vessels and the longitudinal muscle layer. To the extreme right—longitudinal muscle layer is removed to show the circular layer.

A, Segment of intestine hardened in situ, showing the valvulae conniventes; B, shows the same, only in the soft condition. However, the segment B is cut out of the side of the intestine. The cut must be turned top to the right, to see it as it should be.

These liquids descend in the intestine between its contents and the mucous lining, until the chyme is completely reduced to liquid or passes out of the small intestine.

The so-called peristalsis of the intestine is characteristically like that of the stomach, except that, on account of there being no oblique fibres, its vibration is more completely vermiform ☙ ☙

Intestinal digestion is performed by the union, or mingling of the chemic juices, from the abdominal accessory glands, with the chemic ingredients of chyme, or food elements. These are augmented by the chemic liquid exuded from the mucous glands ☙ ☙

It will be seen that the elements for this function are brought from a wide area of the body, and that, from quite a number of viscera, are brought the substances which go into the formation of these several juices, a full understanding of which, can only be had by a separate description of the functions of the accessory organs of digestion.

THE SPLEEN AND LIVER

The physiology of these organs will be discussed together, because so far as digestion is concerned, the spleen is accessory to the liver.

All contributory digestive offices of the spleen to the liver are not known; but the fact that the spleen is a very prominent place for the disintegration of red blood corpuscles, which having been re-carbondioxidized until they are no longer capable of taking on oxygen, proves that the liquids from the spleen are rich in that by-product, haemoglobin, which is one of the principal elements of bile.

The fact that the spleen becomes very considerably congested, with blood and lymph, upon the gustatory impulse being aroused or upon the actual ingestion of food, is a very significant fact, as to its value as a digestive organ; for it will be readily understood that in the economy of nature an organ will not, normally, continuously act in a given way, unless such action is of the first importance.

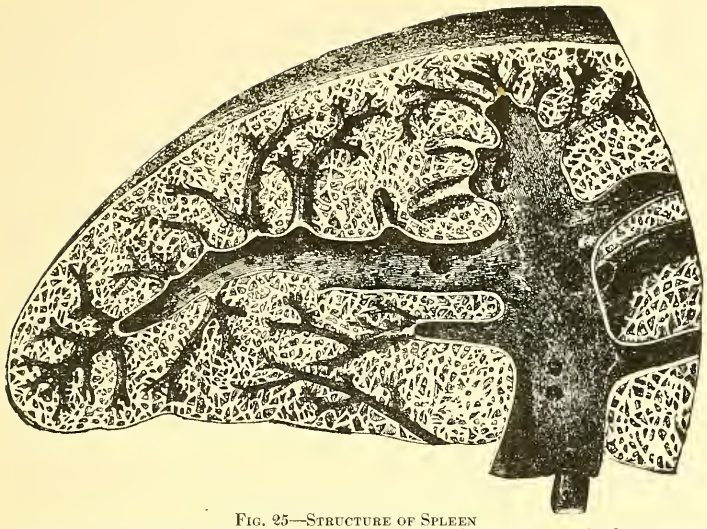


Fig. 25—Structure of Spleen
Cut shows the schematic arrangement of the veins of the spleen, the trabeculae lymph areas and splenic pulp.

The congestion of lymph and blood in the spleen is, not only to furnish to the liver the large amount of, carbon dioxide already mentioned, but to furnish a large amount of all the products elaborated in the liver; such as, glycogen, uric acid and perhaps others not yet isolated.

It is now well established that the spleen is the place where a very large amount of the red corpuscles are disintegrated; the congestion is, therefore, also to furnish to the liver a large amount of freed haemoglobin and other coloring matter and chemicals to enter into the formation of bile.

It must also be remembered in this connection that during the congestion of blood and lymph in the spleen, preparatory to intestinal digestion, that there is produced in the lymph walls of the splenic blood sinuses or splenic capillaries a very great number of leucocytes that pass immediately with the blood through the splenic and portal veins into the liver, and these being young and virile take up through the winking valves of the capillaries of the liver a large amount of gases, and in this manner aid in making possible the production of normal bile and other liver products.

The spleen, therefore, through its vein, which is the largest radicle to the portal, conveys to the liver, a large amount of carbon dioxide, and the principal coloring matter of bile, with some lesser chemicals not so well understood.

There is also conveyed to the liver, from the capillaries of the intestines, mesentery, pancreas and stomach, as well as the omenta, a considerable amount of blood, which, from the additional fact, that a large part of it comes from the capillaries of the large intestine, having received a large contribution from its absorbents, is richly supplied with by-products; the whole being loaded with certain solid residues depurated from places of assimilation throughout the whole area just described ☙ ☙

The veins draining the region referred to, it will be remembered, form the other radicles of the portal vein, through which the blood from that region together with the splenic blood, enters the liver through its various branches and extensive capillary systems.

It is from the portal blood that the lymph is extruded, which when contributed to, by the hepatic cells, elaborates the substances which form the primary constituents of bile, as well as glycogen and uric acid; substances to be more fully considered in another chapter.

Incidental constituents of bile, are also derived from the lymph extruded from the blood, reaching the liver through the hepatic artery.

The machinery for the elaboration of bile, is described in the anatomy of the liver. It need only be stated here, that after the production of this substance, it is discharged through the ducts of the liver into the middle portion of the second division of the duodenum, there to begin the office of digestion ☙

The bile is a highly reactive chemical substance, the constituent elements of which are only speculatively known. The consensus of supposed authority gives the chemical composition of bile as being, in one thousand parts,

Water	859.2
Solids	140.8

the solids being said to consist of:

Bile salts	91.5
Fat	9.2
Cholesterin	2.6
Salts	7.7
Mucous and coloring matters	29.8

For reasons heretofore stated, this must not be taken as authoritative. It is an analysis of inanimate bile, and therefore does not pretend to give all of the chemicals, or nearly all, entering into the composition of bile.

The analysis will, however, serve us for an approximation, until some method is devised, by which we can, without disturbing a normal system, analyze the bile while it is active in function. It seems improbable that such a result will ever be reached.

Bile is, however, a viscid, reddish yellow, or brownish green liquid; bitter to the taste; and having just a perceptible odor; with a specific gravity of about 1020.

It must, however, be remembered that bile is a constantly varying fluid, and that probably there are no two periods in the existence of an individual when an analysis of the bile, if it could be made, would be exactly the same.

Bile is no more fixed, as to normality of consistence than the body, and will be as abnormal, generally speaking, as the body; but it will be especially abnormal with the abnormality of the substance of the liver.

The bile, as it approaches the duodenum, in the duct from the liver, becomes thicker and denser; this owing to the intermingling of its several chemicals and the lessening of the proportion of liquid ingredients.

Bile not used at once in digestion, is stored, by the parts described in the anatomy of the ducts, in the gall bladder, and considerably densifies, and becomes of a deeper yellowish or reddish color and of more bitter taste, being called gall ☙

The primary office of bile, in the duodenum, seems to be to emulsify fats and to furnish a cleansing or antiseptic influence, and to prevent fermentation. It is, however, to be remembered that it is in elaboration, with all of the other substances in the

intestine, that its functions are completed, and therefore they can not be separately known.

THE PANCREAS

It is the office of the pancreas to produce and project through its duct into the duodenum the pancreatic juice, which is a clear, slightly viscid liquid, probably alkaline in reaction, from the fact that the structure of the pancreas is much like that of the salivary glands, with a specific gravity of about 1010.

Speculative investigation has approximated that the component elements of one thousand parts of pancreatic juice are:

Water	975
Solids	25

The solids consisting of ferments, proteids, leucin and tyrosin, fats, soaps, and inorganic residues, especially sodium carbonate. Pancreatic juice as will be remembered, is discharged into the duodenum in relation with the bile; and its chemicals are immediately mingled with those of the bile and food in the intestine, in which they aid in emulsifying fats and converting starch into sugar and performing such other functions as are necessary to further reduce the chyme, free its chemical elements and properly elaborate them so that they may be absorbed ❧ ❧

When these offices have been accomplished, aided by the intermingling processes impelled by nerve stimulus, so that all of the elements of the contents of the intestine are thoroughly admixed, the portions more quickly liquefying pass rapidly ahead of the denser mass, in relation with the lining membrane, thus furnishing an undisturbed opportunity for absorption.

The more solid portions are retained in the upper part of the tube until more thoroughly reduced by the juices. This process is continued until all is reduced if there is time, but if the intestine is too full or the substance is incongenial, the mass may reach the end of the ileum not digested and containing much nutrient substance.

At the proper time in the process; that is, when there is a sufficient accumulation pressing against the ileo-cecal valve, it opens, which is an office performed as a result of tissue sense and permits the passage of those substances into the cecum, then closes again; and so on, until digestion, or in case of failure of digestion, conduction from the intestine is completed ❧ ❧

The liquid substance resulting from the digestive process in the small intestine, is called chyle, and when the substance has all been absorbed, or passed into the cecum, the process of intestinal digestion is terminated.

It seems hardly necessary in this connection to mention that in case of excessive eating, a surplus is absorbed, resulting in an excess of lymph and blood and therefore a congestion at the places of assimilation and depuration, furnishing an active base, for toxins and other disintegrating processes, while uncongenial combinations of food, necessitate the direct absorption of toxins.

It will be observed that in the normal condition the entire process of digestion requires from five to eight hours. Under our modern methods of eating, eight hours is the better approximation. That is to say, mouth digestion, thirty seconds to one minute; stomach digestion, two to three hours; intestinal digestion, three to five hours.

CHAPTER NO. 29

Digestion—Large Intestine

ANATOMIC SYNOPSIS

THE large intestine extends from the ileum to the anus, with the exception that the cecum is feetward from the orifice of the ileum.

The large intestine is about five feet long and begins with a diameter of about three inches, and ends with a diameter of about one inch.

Its wall is constructed like the small intestine, as to its coats.

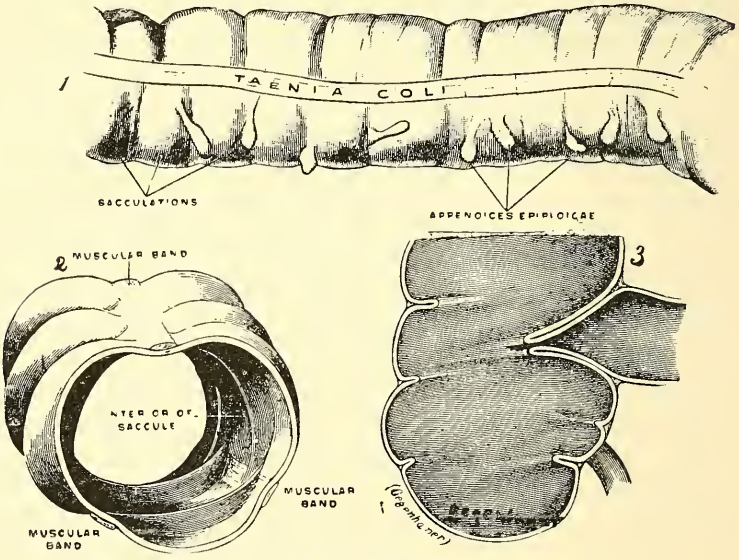


FIG. 26—LARGE INTESTINE

1, shows sacculations—appendices and taenia. 2, shows interior of sacculations. The student should note the arrangement carefully. 3, shows cecum with aperture of ileum closed by ileo-cecal valve and aperture of appendix. The student should note that pressure toward the ileum serves to close instead of open the valve. The orifice of the appendix is constructed in like manner, although not shown in this cut.

The inside of the tube is different, its wall is sacculated, on account of the irregularity of the circular fibres, and there are no villi, the absorbents being the common follicles, and the solitary glands. The mucous glands are large and plentiful. The mucous lining is less blood vascular, and paler, than that of the small intestine. The longitudinal muscular fibres are in three bands called *taenia*. ¶ The gut is considered, under these divisions: *cecum*, *colon*, *sigmoid colon* and *rectum*.

The cecum is considered under cecum proper and the vermiform appendix, which is a wormlike hollow tube extending away from the gut, ending blindly, but discharging into the cecum. ¶ The colon is composed of the *ascending*, *transverse*, and *descending* portions, with the *hepatic flexure*, joining the ascending and transverse portions, while the *splenic flexure* connects the transverse and descending portions. The *sigmoid flexure* connects the descending and sigmoid portions of the colon. It will be observed that the large intestine forms two almost complete circles in its extent, the encirclement of the small intestine by the large, and the pelvic loop of the sigmoid colon. The *rectum* is considered in two divisions, the rectum proper and the *anal canal*. The rectum extends from the third sacral segment to the anal canal. The anal canal completes the gut and penetrates the wall of the body and ends at the *anus*.

Nerves—The cecum and appendix are principally ramified by nerves from the right second lumbar and twelfth thoracic trunks, with some nerves from the right first and third lumbar trunks.

¶ The ascending colon is principally ramified by nerves from the twelfth and eleventh thoracic and first and second lumbar trunks of the right side.

The transverse colon is principally ramified by nerves from the sixth, seventh, eighth, ninth, and tenth thoracic trunks; and receives its richest supply from the seventh, eighth, ninth and tenth trunks.

The descending colon is principally ramified by nerves from the eleventh and twelfth thoracic, and first and second lumbar trunks of the left side.

The sigmoid colon is principally ramified by nerves from the second and third lumbar trunks of both sides, but principally from the left side.

Arteries—The rectum is principally supplied with blood from the hemorrhoidal branch of the inferior mesenteric artery; the middle hemorrhoidal from the internal iliac, and the inferior hemorrhoidal from the pudic artery.

Veins—The veins correspond to the arteries and discharge their blood into the superior and inferior mesenteric veins, which are two radicles of the portal vein.

The rectum is ramified by nerves from the first, second, third, fourth and fifth pairs of lumbar trunks, many of which extend to the hypogastric plexus and are there rearranged before ramifying the rectum. The rectum is also ramified by nerves from all the sacral and coccygeal trunks.

This is especially important as to nerves from the three inferior sacral and coccygeal trunks in displacement of the sacrum or innominates.

PHYSIOLOGIC ANALYSIS

Generally speaking, physiologists are silent, or practically so, with relation to the physiology of the large intestine and for the reason that in experimental dissection the large intestine, constituting such an obnoxious part, is usually thrown away without examination. However, from the small fragment of anatomy of the large intestine that we have obtained, and from demonstrations upon the living body, we derive sufficient information to develop certain physiologic facts ❧ ❧

A consideration of the large intestine at the very outset presents to our view a situation so remarkable, as to render it necessary for a scholar to analyze it, and reach some conclusion at once, and that is the fact that the large intestine is about five feet in length placed in such position as to form two almost complete circles, at least from its origin to its termination, when, if its only office, as suggested by physiologists, was to convey the feces from the body, a nearly straight

tube eight to twelve inches in length would have accomplished the purpose just as completely and much more surely.

Another thing! The lumen of this intestine begins with a diameter of about three inches, which decreases throughout its length, indicating that it was intended to contain much more at its beginning than at any point throughout its course, except its accommodative reservoir, in its last division, the rectum.

The lumen at the beginning is very considerably encroached upon by the *sacculations*, so arranged that the feces, or contents, are passed spirally around the surface, in such manner that its progress is very much retarded. The sacculations become smaller throughout the extent of the intestine and cease at the upper part of the rectum.

The intestine beginning with a diameter of three inches, at the level of the ileo-cecal valve is decreased to two and a half inches at the commencement of the colon, but the lumen of the tube here extends directly away from gravity for a distance varying from six to nine inches.

The hepatic flexure, on the right side of the body bends the gut across to the splenic flexure, on the left side, while the sigmoid flexure bends the gut into the pelvis where a complete loop is formed between that point and the rectum, called the sigmoid loop.

All of these morphologic obstructions to retard the passage of substances in this gut, clearly indicate important offices to be accomplished during their passage. In addition, it will be recalled that the solitary glands, which are absorbents, are quite thickly scattered in the mucous surface of the lumen; that they are of large size, being more numerous in the beginning, or so-called upper portion of the intestine; while the common follicles, also absorbents, are not so numerous and of so large size at the beginning, but increase in number and size throughout the intestine, being especially large in the rectum, so that their orifices can be seen with the naked eye ☙ ☙

There is also a large number of mucous glands thickly scattered over the whole mucous surface of this intestine,

which discharge their substance, between the wall and the feces, where it acts as a lubricant and, in the normal, prevents impaction or adhesion of that substance to the wall of the gut. The important function, performed in the large intestine is absorption, from its semi-liquid contents, of the residuary by-products left over from the compound called chyle, in the small intestine.

The gaseous by-products are transfused through the winking valves of the capillaries of the mesenteric veins, and small lymph vessels discharge the lymph absorbed into the small mesenteric veins, and in this manner aid in the composition of bile and other by-product elaborations in the liver.

These facts clearly indicate the value of normal conditions in this intestine, and should be sufficient to challenge the human family to its proper care.

The cecum, being the great pouch in which the feces are first discharged from the small intestine, is a point from which a large absorption takes place. This sac is supplied with a small *lubricator*, the vermiform appendix, which excretes a thick mucous, that is discharged into the cecum, to moisten its walls, and thus to aid the passage of substances, while mingling its chemical parts with the elaboration there going on, and to prevent the contents of the cecum from sticking to its walls.

Sufficient has been said of the remainder of the tube, except the rectum, at the beginning of which the sacculations disappear; but in the middle and lower part of the headward division of which, there is a large reservoir, to accommodate emergencies of accumulation of feces.

It is arranged so that defecation can be postponed for many hours, permitting a constant accumulation in this reservoir. However, its normal need is to be emptied at once, upon feces accumulating. It was not intended that substances should be here retained, except in emergency.

The accommodative powers of the rectum have led, through ignorance, to very destructive abuses of this portion of the tract, by individuals forming the habit of retention till toxins form, with material disbenefit to many portions of the body,

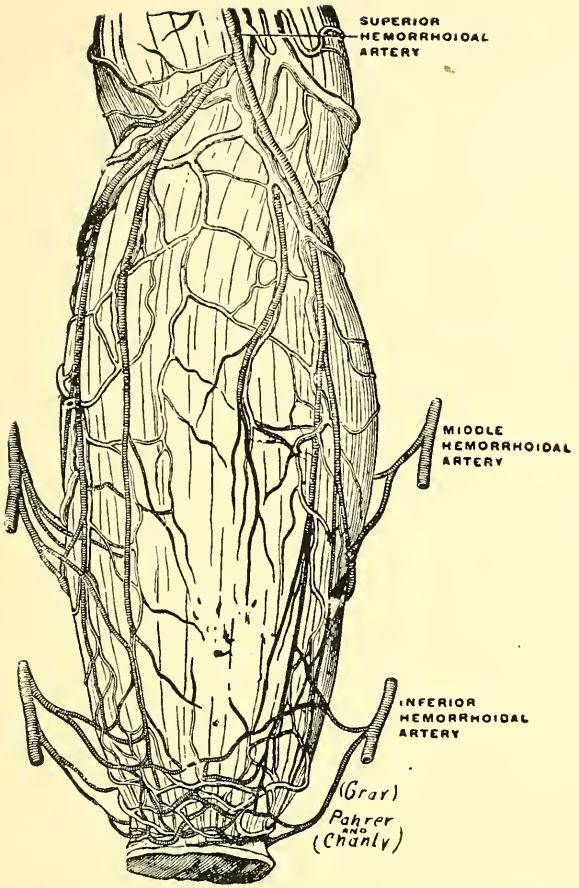


FIG. 27—RECTUM

Cut shows posterior view, curvatures, sacculations and anal canal, but principally shows the schema of the arteries and veins.

through absorption of toxins, and scattering them, through the large glands, to the whole body.

It is one of the considerable functions of the large intestine to conduct the substances, discharged through the ileo-cecal valve, throughout its length and to eliminate their somewhat solid residues from the body.

This process is called *defecation*, a function which is per-

formed by virtue of a peculiar peristalsis of the rectum, aided by constrictions of the abdominal muscles and the immediate muscular tissue.

Much injury is done to the tissues of the rectum, by the pernicious habit of water injection called *enema*. It should be, at all times understood, that the least mechanical interference with the rectum the better.

When the nerves to the rectum are free from occlusion, it should be left alone, except in last emergencies, to perform its function undisturbed.

By last emergency, is meant toxic conditions, where because of impaction, or other obstruction, the toxic substance must be removed quickly, to accommodate other parts of the body.

CHAPTER NO. 30

Physiologic Phases of Absorption

THE phenomena of absorption has challenged the attention of the human family from the dawn of intelligence. ¶ Scientists have expended much time in investigations, looking to a disclosure of the laws involved in the operations which make up this branch of physiology to render a description thereof possible.

Theorists have written volumes upon the subject of absorption with *a theory for an hypothesis, and a series of logical reasons, all theories, for a result.*

All of this energy and these volumes have been apparently wasted, for at the present time they are as far from a description of the machinery by which absorption is accomplished, as they were in the beginning, and also from a description of the manner in which this function is performed.

It is a remarkable physiologic fact, that the machinery and operation at the point of function, no matter at what place or in what relation, or of what character, is without description and is unknown. This includes the most infinitesimal and all parts of the entire organism.

Absorption, depuration and assimilation, so far as demonstration has gone, represent the ultimate objects of all the machinery of the body. All other machinery is accessory to one or more of these functions.

That is to say, all of the machinery, which enters into the preparation of substances for absorption is accessory to that function, which is itself accessory to liquid movement, aeration and assimilation.

All of the machinery, which takes part in the function of depuration, is accessory to it and also to assimilation.

Function classified under the three heads, absorption, depuration and assimilation, really comprehends the phenomena of animation, and is the most wonderful theme that could possibly engage the attention of the mind.

These three functions are all performed in areas too small for the microscope; performed in what are called, by the anatomists and physiologists, spaces of the body. That is to say, between the walls of cells, and in inter-molecular spaces, where there is absolutely no tissue, and therefore no machinery, which has ever been isolated and described.

Yet absorption, depuration and assimilation are performed, with a regularity and thoroughness, such as to call for the greatest admiration of which we are capable. These spaces are co-extensive with the entire organism; are innumerable; and would compose a number incomprehensible if known ☙

The difficulty which the student meets at this point, is to fully comprehend and appreciate the fact, that one or more of these functions are constantly going on to some extent in every atom of tissue of the body all the time, from the impregnated ovum, to the instant of dissolution, at no matter what age. The old physiologists are largely responsible, because of their egotistical desire for aggrandizement, for the limited concepts, generally held with respect to these functions ☙ ☙

Deduction from the basic principle of animation, which accounts for all phenomena, upon an actual mechanical basis, disassociated from theoretic reasoning, has shed much light upon these important functions.

Beginning with the development of the fact that nerve stimulus is not a manufactured product, but is an original energy, which is collected by the brain, and is conveyed through nerves into relation with the atoms of the body, and stimulates them, without the use of any machinery that has ever been isolated, demonstrates that by the same process the intercellular and intermolecular spaces of the body are supplied with stimulus which acts there without discernible nerve organization, as well as it does in other matter.

The facts stated demonstrate that the wonderful functions,

absorption, depuration, and assimilation are performed by this intelligent energy, acting through the cell walls, fluid and liquid substances, in the intercellular and intermolecular spaces of the body; possibly through the medium of machinery which we have not discovered, but much more likely without the necessity for machinery as we understand it ☙ *Absorption*, like any function, is a process, too frequently looked upon as a condition. It has been generally considered to be the process, or series of processes, whereby liquids, colloids and other substances, are taken through the membranes or tissues of the body

That is erroneous. Such action should be classified as *osmosis*, which is such passing through in either direction, not in normal channels. *Endosmosis* means such passing from without into a cavity or vessel; *exosmosis* means such passing out of a cavity or vessel.

Absorption, however, in its primary and functional sense, relates to the bringing of original substances, through organized channels, into the machinery of the body, for the purpose of elaboration and use in its economy, which function is performed solely through the villi of the small intestine; through the general absorbents of the entire intestine; and through the walls of the *infundibula* and *alveoli* of the lungs. ¶ It will therefore be understood that where the term absorption is used in this book, it relates to taking of original substances into the body; and wherever other functions are performed, which might, under old classifications have been called absorption, they will be classified as *osmosis* of the various kinds ☙ Preparation for absorption, through the intercellular spaces of the epithelial surface of the lacteals and intestinal absorbents generally, has been fully described. It is only necessary here to say that absorption is accomplished solely under the direct and specific influence of nerve stimulus, which is proved, by a number of instances in the organism, to be possessed of the power to propel liquids under certain conditions through parts of the body, even directly against gravity ☙ The principal illustrations of the propulsion of nerve stimulus are found, in the passage of fecal matter from the inferior

extremity of the cecum to the hepatic flexure of the colon, all the way against gravity; the liquid in the vessels of movement from the feet to the heart; the conveyance of seminal liquid from the testes to the seminal vesicles; and the follicular liquid from the surface of the ovary, into and through the Fallopian tubes into the uterus.

It is by operation of this same law, that certain elements of chyle are impelled through the spaces of the surface of intestinal mucous membrane, through organized channels called intestinal absorbents, into the blood, constituting the substantial source of its volume.

That nerve stimulus is an intelligent and accommodative energy in this regard, is proved by the fact that persons can, by practice, learn to work for long periods of time, without apparent injury, with the body inverted, which, if attempted at once, would result in grave congestion in the brain and tissues of the head.

It is quite certain that little of the substance absorbed by the villi of the intestine enter the blood through the thoracic duct.

It is certain that substances absorbed through the general absorbents of the intestine, are to a considerable extent discharged into the *mesenteric blood*, that from the large intestine, containing a larger per cent of by-products.

It has been demonstrated that through the absorbents of the large intestine, the organism can, to a small degree, be nourished. However, it must be understood, that this is primarily, from sustaining the volume of lymph, blood and the gases and not the introduction of food.

Absorption through the lungs, will be sufficiently described under the physiology of respiration, and it will only be here stated, that through absorption the lymph receives oxygen and water, with probably some other elements not known, which is passed through, the winking valves of the pulmonary capillary walls, into the blood.

One other medium of entrance, of substances into the body, is through the skin, and this word skin as used includes the skin of the outside, or integument, and the skin of the inside, or mucous and serous membranes.

In order for substance, to pass through the skin, the conditions must be abnormal. That is to say, the skin itself must be abnormal in its relaxation; in the injury of its outer part; in the paralysis of its glands; or its surroundings must be sufficiently abnormal, to break down the resistance of the skin ❧ ❧

It is known that extreme thirst will be allayed usually, by immersing the body for a considerable length of time in water, which is a sufficiently abnormal condition to result in a temporary paralysis of the external cells of the skin, together with the periphera of nerves, so that the radiation of stimulus is occluded, and the cells thus rendered inactive, and normal resistance temporarily suspended.

In the condition described, the entrance of liquid is an endosmosis, because the elements are forced, by extrinsic pressure, into the machinery of the body, and not impelled into it, by nerve stimulus, as is the case in absorption.

It is by the process of endosmosis that powerful chemicals, such as alcohol and turpentine, so quickly pass through the skin ❧ ❧

It is by the process of endosmosis that substances enter the machinery of the body, through mucous membranes, not supplied with absorbents; such as the nasal meatus, pharynx, esophagus, and stomach. It is a great mistake to suppose that absorption, through the walls of the stomach, ever takes place; osmosis may, but absorption never.

The serous membranes have been supposed to be supplied, with some kind of absorbents, because following abnormal conditions, in which there has been filtration into serous cavities, with the return of normal stimulus, the accumulated liquids are quickly passed through the membranes, into the lymph system, of the affected area, and carried away ❧ Removal of these liquids is accomplished by exosmosis, forced by the pressure of the contained fluid, acting in conjunction with lymph movement, under restored stimulus. Special reference is made to the cavities of the thorax, pericardium, and abdomen, as well as the meninges and ventricles of the brain and cord.

CHAPTER NO. 31

Physiology of Lymph System

ANATOMIC SYNOPSIS

THE machinery of the lymph system begins with the villi, common follicles, and solitary glands of the intestine, and consists of lacteals, lymph spaces, canaliculi, capillaries, vessels and ducts, which include, depuratory tubes in the mucous and serous membranes, and the sudorific and sebaceous tubes of the skin. To these should also be added the lymph glands proper.

The lacteals are the tubes that drain the villi of the intestine. Lymph spaces occur in every part of the animate body ☙ Canaliculi are quasi-tubes that drain lymph spaces. Lymph capillaries are the beginnings of actual tubes for conveyance of lymph. Large lymph vessels are nearly always called ducts without any reason therefor. The tubes, through which mucous and serous membranes and the skin eliminate, extend direct from small lymph glands. These glands are called excretory ☙ ☙

Lymph glands are composed of a peculiar glandular substance, and are globular or elongated. They have sinuses on the inside, or medullary portion, lined with epithelium. Among the cells of this epithelia, there grows a peculiar cell that has no tissue forming power, called a leucocyte ☙ Lymph glands are very numerous throughout the body and compose the chief part of all the large glands of the body. They are specially aggregated in the cervical region, along on both sides of the vertebral column of the trunk, in the axilla and inguinal regions; in the femoral sheath and Hunter's canal; in the interosseous areas of the forearm and leg and within the skull relative to the sutures.

These statements, however, must not be permitted to lead the student's mind from the fact, that lymph glands are very richly supplied to all parts of the body.

A leucocyte, when fully matured, separates from its nest of epithelial cells and floats in the lymph of the sinus, and passing out of the gland, travels in the lymph to its entrance into the blood, when it immediately becomes a white blood corpuscle, and then by the changes incident to aeration, it gradually becomes a red blood corpuscle and as such goes on to old age and disintegration.

The two principal ducts of the lymph system are, the *thoracic*, which extends from the *receptaculum chyli* in front of the first lumbar vertebra, headward for fifteen to eighteen inches, where in relation with the seventh cervical vertebra it bends to the left and feetward, entering the left subclavian vein at its juncture with the mesial jugular, its diameter being about that of a goose quill; and the right *lymphatic duct*, which enters the right subclavian vein in the same manner as already described.

The lymph movement may be conceived as occurring in two parts; primary lymph or lymph of immediate absorption; and secondary lymph, being that which has passed into and out of the blood. Secondary lymph, therefore, being generally found in the lymph spaces, canaliculi and vessels aside from those of the mesenteric region.

Nerves—The lymph system is as extensive as the nerve system and, therefore, the only nerve ramification that can be given as to it is the ramification of any selected area, which must be left to the anatomic resource of the student.

PHYSIOLOGIC ANALYSIS

Primary lymph is a clear, or colored liquid, depending upon the activity of the digestive system, which furnishes to liquid movement its entire volume.

The greater volume of primary lymph is derived from the villi of the small intestine, however, it must be recalled that lymph is absorbed through all of the intestinal absorbents &c

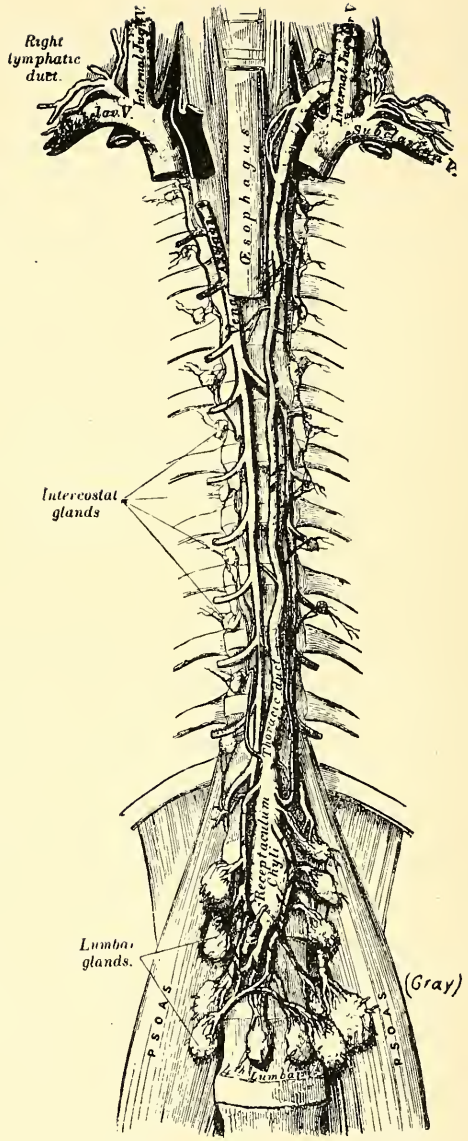


FIG. 28—THORACIC DUCT

Cut not only shows thoracic duct, but receptaculum chyli, the discharge point—the right lymphatic duct and also shows a large number of vertebral lymph glands and lymph vessels.

During the process of digestion in the small intestine, it will be recalled that the chyle, as rapidly as formed, is given a pressure and direction that brings it into close contact with the mucous lining, or as it were, with the villi of the intestine. ¶ Nerve stimulus acting through the intercellular spaces and follicles of the villi and other absorbents, impels the substance of the chyle into the lacteals, etc. The substances thus taken from chyle, should comprise the original elemental chemicals of which the organism is composed.

The liquid solids, and a large amount of water, intermingled in the lacteals is termed lacteal fluid, which is to some extent carried into the receptaculum chyli and thoracic duct, through the lymph vessels of the mesentery, and thence headward to be intermingled with the blood at the angle of junction between the left subclavian and left mesial jugular vein ❧ ❧

It is believed by some physiologists, that certain of this liquid reaches the blood through the walls of the capillaries immediately adjacent to the lacteals, and in this manner reaches the portal circulation by way of the mesenteric circulation. This is the strongest reason for this blood going directly to the substance of the liver instead of returning to the heart, as is the usual method, for blood that has passed through one set of capillaries.

At the points of intermingling of primary lymph with the blood, it becomes blood plasma, and enters the right auricle of the heart, and passes through the right auriculo-ventricular orifice into the right ventricle, and then through the pulmonary arteries to the lungs, where certain of its gases, principally carbon dioxide, are given off, and certain substances, principally oxygen, are added.

The blood plasma is then conveyed to the left auricle of the heart through the pulmonary veins, then through the auriculo-ventricular orifice into the left ventricle, and then through the aorta, finally reaching the capillaries of aortic branches, where it is extruded from the blood through the winking valves of capillary walls, carrying its nutritive elements, which are to be used in rebuilding, and replacing,

debilitated and disintegrated cells, and to supply the exuberant qualities of the body. This process is later to be more fully described under the head of assimilation.

After assimilation, the residuary, or remaining lymph passes into the canaliculi and lymph vessels and finally, at some point, enters the veins and mingles again with the blood, and is the lymph from which the larger portion of by-products, is given off in the lungs and elsewhere.

It will be seen that lymph constitutes the origin and termination of liquid movement. It is the primary liquid of the body, from the period of the beginning of liquid movement in the embryo, throughout the remainder of the existence of the organism ☙ ☙

Lymph contributes to the blood all of its nutrient elements, even those, which are received through the lungs, in the form of gases, principally oxygen, and certain small portions, which may, by abnormal process, occasionally, reach it through the skin, which, in both instances, first enter lymph spaces, and from thence the blood, through the walls of veinules.

There is one portion of primary lymph which, by reason of the location of its absorption, deserves somewhat prominent notice, because of the very important influence it exerts on the health of the organism. This is the lymph, absorbed from the feces in the large intestine, and which conveys to the liver, largely through the mesenteric blood, much of the by-products, from which it elaborates bile, glycogen, and uric acid ☙ Situated, at almost all parts of the lymph system, there are lymph glands. The anatomy of lymph glands has been given very briefly.

At certain locations of the body these glands are massed together in great aggregations. This is especially true of the inguinal region, the posterior wall of the abdomen, along the sides of the vertebral column, in the neural canal, in the mesentery, spleen, pancreas, liver and stomach. Also in the cervical region and axilla. There are also many of these glands in the medullary portion of bones and in the meninges. ¶ It is the function of the lymph gland to produce, by a process of gemmation lymph corpuscles which, when suffi-

ciently mature, drop off into the lymph and float in it from the gland, into lymph channels and finally into the blood, where they are classified as white blood corpuscles and finally, by the process to be later described, they are further matured and converted into red blood corpuscles.

Primary lymph, immediately after being absorbed, does not contain lymph corpuscles, but in the mesentery some of it passes through lymph glands, and lymph corpuscles begin to appear in it. The more it is intermingled with lymph that has passed through lymph glands, the more numerous, become the lymph corpuscles in it.

By the time lymph has reached the thoracic duct, it has been sufficiently elaborated by intermingling with other lymph, that it is capable upon exposure, of forming a clot similar to blood clot, without red corpuscles. Lymph clot is softer and moister than blood clot, with the lymph corpuscles entangled in it, and the nutrient matter forming a white or creamy film on the surface of the serum.

There are certain conditions, such as heat, cold, and association of materials, that will prevent lymph, like blood, from clotting ☙ ☙

It will be seen that all of the elements of blood are in lymph, immediately before its admixture with blood, except solely the red corpuscles.

It will be recalled, that lymph glands in the spleen are very numerous, and that the spleen is classified as one of the prominent sources of the white corpuscles, and also that the machinery of its liquid movement is such, that many lymph corpuscles, produced in the spleen are at once delivered to the blood, and pass through the splenic vein, into the portal transportation, and by that route reach the general blood movement ☙ ☙

The movement in the primary lymph system may be described as being from periphery to center, or in other words from the absorbents to the points of discharge into secondary lymph and blood.

The secondary lymph movement, it must be remembered, begins at intercellular spaces in the tissues generally, and

ends with the depuratory glands, skin, lining membranes, and the blood.

The phenomena of the movement of lymph, through its vessels, beginning with its spaces, will be described in connection with the movement of blood, a little further on.

The student, before leaving this chapter, should bring himself to a realization, that lymph is the all-important liquid of the organism, and that it enters, as the basic substance, into the composition of all of the twenty-four or more liquids. ¶ He should bring himself to understand, that lymph is the liquid of vital function of the organism, and that it is the only liquid directly and primarily involved in the three ultimate functions of animation, to wit: absorption, depuration, and assimilation.

Some idea of the relative volume of the lymph to the blood, may be had, by recalling the fact, that the body is about seventy-five per cent liquid, and blood is only about one-twelfth of the body weight.

Of course the other twenty-two or more liquids are not called lymph, but lymph is their principal ingredient.

CHAPTER NO. 32

Physiology of Blood System

ANATOMIC SYNOPSIS

THE machinery of the blood vascular system is the heart, arteries, arterioles, capillaries, veinules, and veins

The heart is about five inches in length, three and a half inches in breadth, and two and a half inches in thickness, situated in the thorax, extending about an inch and a half to the right of the median line, and three and a half inches to the left of the median line, its position being oblique; occupying the distance between the second and sixth intercostal spaces; the base of the heart looking headward and to the right, while the apex points ventro-feetward and to the left

The heart is divided into four muscular chambers, the two basilar chambers being thin-walled, and called the *auricles;* the two apical chambers being thick-walled, and called the *ventricles.* These chambers are separated from each other in the transverse by the auriculo-ventricular septum, and are separated lengthwise by a septum that extends the whole length of the heart; the septum between the auricles being very light and deficient before birth, having the *foramen ovale* through it, which closes at birth; the inter-ventricular septum being very heavy; the right ventricle is very heavy, compared with the auricles, but less so compared with the wall of the left ventricle, which is three times as thick.

The heart is considered, as being a right and left heart, composed of the right auricle and right ventricle, connected through the auriculo-ventricular orifice, which is guarded by the *tri-cuspid valve;* and, the left auricle and left ventricle,

connected through the left auriculo-ventricular orifice, which is guarded by the *mitral valve*.

The right auricle receives the ascending *vena cava* and descending *vena cava*, the two large veins which drain the entire system; and the *coronary sinus*, which drains the blood from the substance of the heart itself.

The right ventricle discharges through the *conus arteriosus* and *pulmonary artery*, which after about two inches, divides into the right and left pulmonary, and carry the blood for aeration to the lungs; which arteries, after dividing into the pulmonary capillaries, reconverge into the four *pulmonary veins*, two in each lung, which extend to the left auricle of the heart; therefore, carrying all of the aerated blood, from the lungs, to the heart.

The left ventricle is drained, through the *conus arteriosus* and the *aorta*, the systemic artery, that by branching, supplies blood to the entire organism, which after subdividing to its systemic capillaries, converges to the formation of two great systemic veins already mentioned, that enter the right auricles of the heart. The valves that guard the bases of the pulmonary and aortic arteries respectively, are the pulmonary semilunar valve and the aortic semilunar valve.

It will be seen that the right ventricle, the pulmonary arteries, arterioles, capillaries, veinules and veins, together with the left auricle of the heart compose the pulmonary system; while the left ventricle, the aorta and all of its branches, the arterioles, systemic capillaries, veinules and veins, terminating with the ascending vena cava, and the descending vena cava and the right auricle of the heart, compose the machinery of supply to the entire system.

PHYSIOLOGIC ANALYSIS

The blood is a reddish liquid, consisting most largely of almost colorless lymph, called plasma, in which are minute somewhat disc-shaped masses of protoplasm, called blood corpuscles. These are classified as being red and white, and it is owing to the presence of the red corpuscles that the blood has its color.

Blood is an incidental substance, occupying a position between lymph of supply, upon the one hand and secondary lymph upon the other. ¶ It carries in suspension in its liquid part, all of the nutritive substances, from intestinal absorption, and the gaseous elements, for use in sustaining the body, and also disintegrated matter, usually termed worn out tissue; waste substances; gases for elimination, and in its corpuscles gases, especially oxygen and carbon.

The blood at no place supplies substance to tissue directly, and it at no place receives any of its nutrient elements directly. Those liquid solids which are derived from food, reach the blood through primary lymph, which also carries oxygen. The blood's principal supply of oxygen and other gases are derived from the lymph system, immediately surrounding the alveoli and infundibula of the lungs, which primarily receive these gases from the atmosphere, and into which are discharged the gases for elimination. Blood receives liquid and gases from the intestinal absorbents generally ❧ The blood, therefore, can in no sense be said to be a functional substance, except that it is simply a safe, convenient, and ready vehicle for the transportation of nutrient elements, to the capillaries of the various parts of the organism, in relation with which, the spaces of the lymph system are situated, and which receive from the blood through the winking valves of the capillaries, those nutrient elements and convey them to the places of function.

The blood, as a common carrier, receives certain gases from the lymph directly through the intercellular spaces of its capillaries, and liquid solid residues of tissue, from lymph vessels at different parts of the body; but especially from the thoracic and right lymphatic ducts.

Blood also conveys these substances, to the various depuratory glands, and again extrudes them, with other substances, through the capillary walls into lymph spaces, from which places, the machinery of the glands, under stimulus direct them into the channels of elimination.

The blood derives its white corpuscles from lymph corpuscles, with which they are in every respect identical.

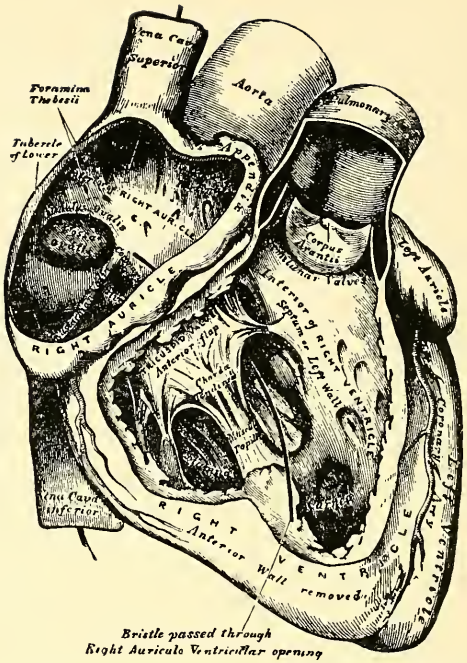


FIG. 29—RIGHT AURICLE AND RIGHT VENTRICLE

Cut shows the heart in situ. Its relation to all of the parts is good. The student should notice the name of each part is printed upon it.

The white corpuscles mature by adding the element of hemoglobin, which finally constitutes about ninety per cent of their bulk.

By repeated passages through the lungs, subjected to the transfusion of gases, in the process of being aerated, and through the capillaries, subjected again to the transfusion of gases in the process of being carbonated, the white corpuscles finally become red blood corpuscles, varying in the density of their color, with age, and perhaps also with activity.

When red corpuscles have reached that stage of maturity, in which they can no longer perform the function of receiving oxygen, or discharging carbon, they pass to the various ductless glands of the body, principally the spleen, suprarenal

capsules, and thyroid glands, where they are disintegrated.
Part of the substance of red corpuscles is used, as coloring matter in different parts of the body; their freed by-products going into the composition of various substances, produced by the glands of the body, which have been incorrectly termed internal secretions; the residues passing from the body in general elimination.

It must not be overlooked that corpuscles classified as white have an affinity for oxygen, and carry it. It will also be understood that oxygen is to a large extent carried in the serum (lymph) of the blood and that a portion of the carbon dioxide is thus carried.

However, the gases generally are carried by the red and white blood corpuscles. It is not by any means unlikely that the white, on account of youth and virility, carry more than the red.

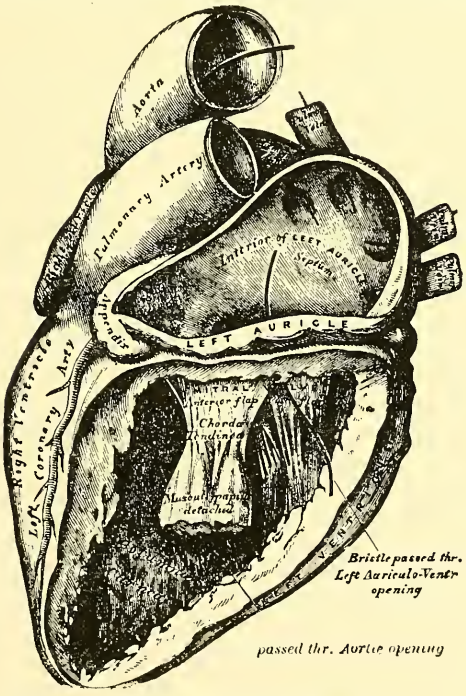


FIG. 30—LEFT AURICLE AND LEFT VENTRICLE
This figure is rolled on its axis almost half way to the right.

The specific gravity of normal blood, so far as is known is about 1058. Its reaction is faintly alkaline, and it is of a saltish taste; its normal temperature in the living body is about 100 degrees Fahrenheit. The temperature of the blood, however, must be understood to vary somewhat, in different individuals, and in the same individual at different times, owing to the condition of the body. That portion of blood in the more external capillaries of the body will also be cooled, over that in the deep interior. This change by reason of the rapidity of liquid movement is substantially imperceptible ❧

From the most reliable experiments that have been made and which of course can not be considered reliable, but from which an approximation can be made, the blood in an individual in a reasonably normal condition is said to amount to about one-twelfth of the total weight of the body.

If to this approximation, the student relates the fact that the volume of blood changes remarkably, from the normal to abnormal condition, and is reduced very much more, in all those phases of abnormality, which affect absorption, especially from the small intestine, he will not find himself without a basis for reasoning, with respect to this phenomenon ❧

It is, however, very doubtful whether a satisfactory estimate of the volume of blood in the body will ever be reached. It can be easily seen that it can not be reached by bleeding an individual to death, for during that process, a very great volume of lymph would be added, and there would be a residue in the blood vessels. If the blood was extracted from an individual suddenly killed, without loss, much of it would escape into the tissues of the body and evaporate before it could be obtained.

The only method, therefore, is the one which has been employed, to remove the blood as quickly as possible from the dying individual, and guess at the difference, between that volume, and the amount immediately preceding death ❧

One of the peculiar properties of blood is coagulation or clotting. This occurs when blood is exposed to the atmosphere. The process of clotting generally begins instantly upon the exposure of blood to the air. It is due to the development of

a meshwork of fine fibriles, called *fibrin*, which entangle the corpuscles and indeed at first include the whole constituents of the blood. In a few minutes, however, drops of pale straw-colored liquid begin to exude from the mass, which proportionately lessens in size, and in the course of an hour or two the solid part floats in liquid.

The liquid is the serum of the blood, or more properly the lymph, from the emulsified albumen of which, the fibrin of the clot is composed.

Coagulation is increased by (1) moderate warmth, (2) being undisturbed, (3) contact with a foreign substance, and (4) free exposure to the air.

Coagulation is retarded or suspended by (1) cold, (Blood kept at 32 degrees Fahrenheit will not coagulate), (2) water added to it, in more than twice its bulk, (3) the addition of neutral salts, and (4) by pronouncedly imperfect aeration immediately before death.

The corpuscles by weight are said to be about forty-five per cent of the blood. The proportion of white corpuscles to the red is generally stated as being one to five hundred. It must be understood that this estimate is far from correct.

The reason for the error lies in the fact, that a red corpuscle taken by itself is of a pale yellowish tinge, and its transition from white to that color is very gradual. It is only the great aggregation of these corpuscles that gives the deep red color to aerated blood.

In the experiments upon which the estimate stated was based, white corpuscles in the early state of transition were undoubtedly classified as being red.

It must be remembered that white corpuscles begin turning red, at the first passage through the lungs, and in aggregation, show red after the first oxygenation.

A full grown corpuscle is about 1-3000 of an inch in diameter, and 1-12000 of an inch in thickness.

Generally speaking, the gases contained in the blood are carbonic acid, oxygen, and nitrogen. One hundred parts of blood generally contain about fifty to sixty volumes of these gases collectively.

All of these gases are found in the blood, no matter whether in the arteries or veins. ¶ However, in the systemic artery and pulmonary veins, the oxygen is relatively greater than in the pulmonary artery and systemic veins.

In the aorta and its branches and in the pulmonary veins, the ratio is:

Oxygen.....20 per cent
Carbonic acid.....39 per cent
Nitrogen.....1 to 2 per cent

In the pulmonary artery and the systemic veins:

Oxygen.....12 per cent
Carbonic acid.....46 per cent
Nitrogen.....1 to 2 per cent

These, of course, are only approximate ratios, and will be understood to vary materially in different cases, with relation to normal, or abnormal conditions and location, surroundings, atmospheric conditions, etc., as well as with activity. There will also be a greater per cent of carbon-dioxide in the veins of the *portal system*. ¶ From what has been said it will be seen that the blood has the following uses:

(1) It is the medium for the reception and storage of all nutrient substance, under proper circumstances, of which the organism stands in need, which it receives from the outer world through primary lymph.

(2) It is the medium of transportation of these substances, to all blood capillaries, in relation with the places where they are used and the extrusion of them, by the impulsion of nerve stimulus, through the winking valves of the capillary walls.

(3) It is the medium, into which a large part of the residuary, or refuse matters and gases from the tissues of the body, are finally brought, for transportation to the capillaries in the various depuratory glands, and extruded through their walls, so that the glands, acting in response to stimulus, may direct them into the various channels of depuration.

(4) It is liquid, and has the quality of quickly receiving, and eliminating heat; it is constantly moving about through the body; and for these reasons, is an aid in maintaining equilibrium of temperature.

CHAPTER NO. 33

Physiology of Blood Transportation

ANATOMIC SYNOPSIS

THE machinery of blood movement consists of the heart, arteries, arterioles, capillaries, veinules and veins.

The arteries are cylindrical tubes, the walls of which remain patent at all times. They are composed of three coats, the inner, middle and external.

The inner coat consists of yellow elastic tissue in the form of a serous membrane; the middle coat is composed of muscular, elastic and white fibrous tissue; the external coat is fibrous and contains elastic and muscle tissue. Between the external and middle coats, there is the circular elastic membrane ☙ The nerves which ramify the middle and inner coats are called vasomotor nerves.

In arterioles these walls are very thin. Capillaries connect, the ends of arterioles with the beginnings of veinules. An arteriole ends by becoming a capillary. A capillary ends by becoming a veinule. The capillary wall is composed of one layer of cells, between which there are *winking valves*, where the edges are not attached by cellular cement.

Capillaries vary in diameter from one three-thousandth to two-thousandth of an inch; in length, from one-thirtieth to one-twentieth of an inch.

The *aorta* is the great systemic artery. It ascends from the heart for about two inches and bends dorsally and to the left in the arch, from which it gives off three branches, the *innominate*, *left common carotid* and *left subclavian*. These extend to tissues headward from the heart, and through these

and their branches, their head and upper extremities are supplied. After the arch, the artery extends feetward in what is called the thoracic aorta, through the diaphragm, into what is called the abdominal aorta, to the level of the fourth lumbar vertebra, where it divides into the right and left common iliac arteries. From the thoracic, abdominal and iliac arteries, the general trunk viscera and feetward appendal structures are supplied.

Incident to the systemic blood movement, there is the *portal system*, which is made up of veins, the splenic, inferior and superior mesenteric, cystic and gastric, these by joining, compose the *portal vein*, which enters the liver through the portal fissure, and breaks up into the portal, hepatic capillaries, which by extrusion furnish the principal by-products, out of which bile and uric acid are elaborated in the liver.

PHYSIOLOGIC ANALYSIS

There has been much speculation, since the pronouncement by Harvey, A. D. 1616, that the blood actually circulated through the body, as to how that phenomenon is accomplished ❧ ❧

It has been advanced that it is accomplished or at least materially aided by atmospheric pressure through the lungs and upon the body; that it is at least aided by muscular activity; that it is accomplished by electricity or magnetism, and many other theories, of which space forbids the mention, since none of them appear to be of value.

The last and therapeutically accepted theory of circulation is that the heart is a pump, and pumps the blood through the arteries from itself, thence through the capillaries and veins back to itself; it being generally accepted, that muscular activity aids the heart in accomplishing this feat.

Harvey did not attempt to explain this phenomenon in any way. He only proclaimed that the blood actually circulated, that is, passed from the heart into the arteries, thence through the capillaries and veins into the heart again.

Great and far-reaching as was the discovery of Harvey, from

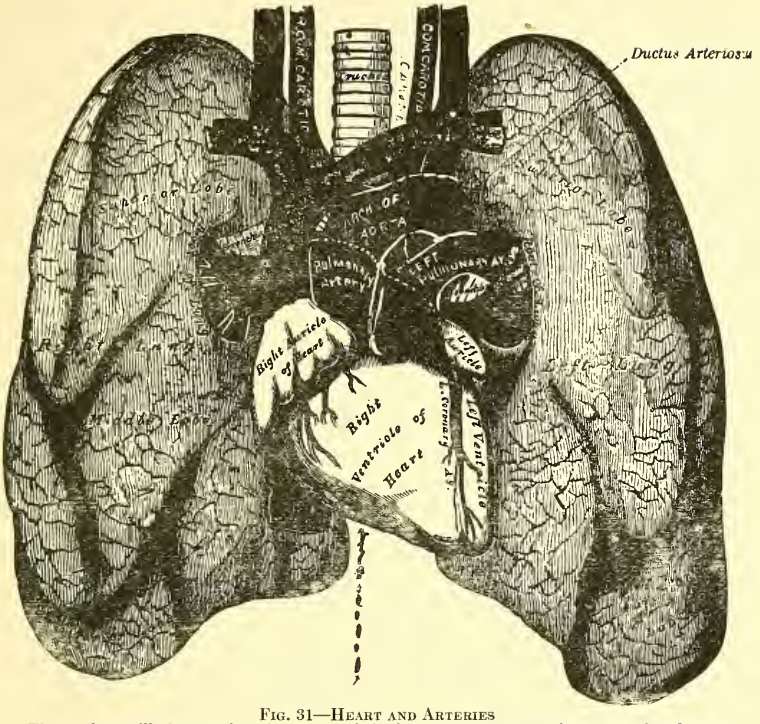


FIG. 31—HEART AND ARTERIES
The student will observe that the names of the important structures here are printed upon them. This cut is worthy the most profound study, for the parts are well related. The knowledge to be obtained is accurate.
The student will remember that he is looking at the ventral aspect. The median line of the body is indicated by dotted line at the bottom of the cut.

which it is not the purpose here to detract, yet it must be stated, that from the standpoint of value to functional knowledge it was quite unimportant.

For to know that the blood moves and not know how it does so, that is what causes it to do so, leaves the student in as helpless a situation, practically as though he did not know that the blood moves.

I find it impossible to agree with Harvey that the blood circulates. It is true that the red corpuscles and the white also, do in a general way, continue to circulate through the blood vascular system; but circulation of blood is not a fact so. Sufficient lymph is being constantly received, in a so-called

normal individual, into the blood vascular system, from various lymph entrances, to maintain the volume of the blood, and to compensate for the volume, that is constantly being extruded through the winking valves of the capillaries, into the lymph spaces of tissue, to keep up the volume of functional lymph, from which all nutritive substances are obtained, and into which all depuratory substances are received. ¶ Sufficient has been said, in the physiology of the lymph system, and in the paragraph preceding this to disclose, at this juncture that, it is the movement, not only of the blood through its vessels, but the lymph through its spaces, vessels, ducts and tubes, that is being definitely considered.

This comprises, as the student will recall, an explanation of the movement of the twenty-four or more liquids in the human organism; for it is clear that it is just as important, to know how lymph is raised from the feet to its points of entrance into the blood, generally against gravity; how sweat is conveyed to the surface of the body; how seminal fluid is impelled from the cul-de-sacs of the tubules of the testes and through the vas deferens into the seminal vesicles and from thence to the completion of its functional office; the follicular fluid is carried and directed from the Graafian follicles of the ovary into the fimbriated extremity of the Fallopian tubes, and thence to its functional offices, and so on throughout all of the liquids of the body, as it is to know how blood moves; for it is clear that each of these liquids moves in the scope of its function, in the same way, and by operation of the same force, applied in the same way.

I desire to announce to the world for the first time, clearly and definitely, *that the blood, and all of the liquids of the body, that move through vessels, ducts*, or *spaces*, do so by the application of an *intelligent force* that biologically should be designated as, telekenetic or *kenetic energy*, which force acts through the materials of which the human organism is composed, in the first instance, in a way to cause them to form into animate structure, and in the second instance to maintain that animate structure. That force or energy, I have named the *force of life*, or *nerve stimulus*.

It is by the operation of the force of life through the organism that motion is obtained. Motion thus caused is *individual vibration* ❧ ❧

Beyond that the phenomena are divided, for our consideration, into as many aspects as we are capable of differentiating functional operation.

The radiation of nerve stimulus through the nerves, causes parastalsis, respiration, contraction of muscles, and other functions. Indeed, all movement, incident to animation, is caused by the application, in the normal way, of nerve stimulus ❧ ❧

The movement of the blood, and all other liquids presents to us the same phenomena. Blood moves through its vessels by the propulsion of nerve stimulus, in just the same manner, that the particles of muscles respond to that same force in the process of contraction and extension.

We can not think of force, applying itself to the substance of muscles, any more easily than we can conceive of a force, applying itself to the particles of a liquid; only we have been prepared by a long line of materialistic training to consider, not very closely, the former; but to be shocked into disbelief at the mere statement of the latter, which upon the closest investigation will be found to recommend itself to our acceptance as completely as any phenomenon, which we are capable of accepting.

I claim for the disclosure of this truth, no honor; but I recommend it to the careful and painstaking study of the student, as *the most profound fact in the study of function*, and of so much more importance than the discovery of Harvey, as by comparison, to cause his discovery to sink into insignificance.

¶ The movement of the blood, is accomplished through the heart, arteries, arterioles, capillaries, veinules and veins. The fact that challenges attention is, that the movement is a continuous process.

The heart has always been considered as the principal organ of circulation, and has been considered to be always active ❧

The first mistake is in the theory that the heart is the principal organ of blood movement. As has been before suggested,

it is but the central organ of the blood vascular system ☙
The second error is, that the heart is constantly in motion. Upon close investigation it is found to rest about one-third of the time, and that while these periods of rest are short, and constantly alternating with great activity, yet they are, generally speaking, uniform, and are relatively the periods of rest, which are necessary to the organism in its normal condition or one-third of the time.

The blood movement presents two important phases for consideration. The first is the action of the heart and its accessory vessels, and the second is the sounds of the heart.

ACTION OF THE HEART

The primary organ of liquid movement, it will be seen, is the brain, which, with its nerve system, is the medium through which the heart receives its *cardiac* and *vasomotor stimulus* causing it, and its vessels, including their contents, to have motion. Recalling the anatomy of the heart, it will be remembered that the blood enters the right auricle, through the descending and ascending venae cavae, and the coronary sinus; and enters the left auricle through the four pulmonary veins ☙ ☙

It will be understood that immediately following every contraction or systole of the auricles, to project their contents into the ventricles; the blood which is held back by the systole, so as to fully distend or stretch these veins, rushes into the auricles filling them almost at once.

At this time the ventricles diastole, while the great arteries leading from them systole in unison with the systole of the auricles, snapping shut the semilunar valves of the arteries, while the plunge of the blood from the auricles, gives to the ventricles a throb-like distension.

Immediately following the termination of the systole of the auricles, their diastole, together with the diastole of the arteries, begins in unison with the systole of the ventricles, thus quickly closing the valves of the right and left auriculo-ventricular orifices.

These alternate movements of the heart, with the periods of rest stated under "Sounds of the Heart" are continuous, differing in rapidity in different individuals, and differing in the same individual, under different conditions of health, food, activity, location, heat, elevation and atmosphere ❧
It will be remembered that all of the true valves, in the heart, are so constructed that blood, coming against their flaps, with the sudden systole of the heart or arteries, closes them abruptly, and that their flaps are so arranged by muscular and tendinous fibres, as to prevent them from passing too far into the orifice which they are to close.
With the succeeding diastole, the pressure is removed, the flaps are relaxed and float back into a position of rest, and in such manner as not to obstruct the orifices of the chambers, or arteries ❧ ❧
The heart and arteries are so constructed that with each systole of the ventricles there is a diastole of the arteries, which passes in a wave-like impulse throughout their length, including their branches.
It will be observed that one of these wave-like impulses, occupies the same time as that of the systole of the ventricle. This not only results in stretching the artery to its full size, but the impulse actually distends it, so that if the finger be placed upon a superficial artery, at any point, the wave-like diastole is plainly felt, and has been called the pulse ❧
The diastolic wave was formerly supposed to be the stretching of the artery, from pressure of blood projected by the heart, but a moment's contemplation of the estimated blood moving force of the systolic impulse of the heart, which is said to be, from the left ventricle, 3.21 foot-pounds and from the right ventricle, .822 foot-pounds, makes it apparent that such force is not sufficient in any event to produce the phenomenon ❧ ❧
If the artery, with all of its branches, was full of blood, it is very clear that the resistance would neutralize the force as stated, in a very short distance, and if the arteries were not full of blood, that amount of force, so far as it would carry the blood, would not be sufficient to produce the impulsive

distension of the thick walls, and by the time the blood reached the smaller and more superficial arteries the wave-like impulse would have been overcome by friction.

It is therefore clear, that the diastolic wave-like movement, is caused by nerve stimulus applied to the tissues of the arterial walls, and the molecules of their contents, in the same way. Diastolic and systolic waves, follow each other at equal distances. The dilations and compressions of the arteries, can not be said to aid in the onward flow of the blood in any manner; for it will be seen, that the freedom gained by the blood in the diastole will be, exactly compensated for or lost in the systole, distance only being considered, and that the tendency of the systoles, in the ever-decreasing diameter of the artery, will be to check, rather than facilitate the flow of blood ❧ ❧

The checking of the speed of the arterial blood stream, by this process, is permitted by the continual branching of the arteries thus increasing their capacity, and comports with the necessities of function at the capillaries. It also comports, with the fact, that blood flows slower in the smaller arteries than in the larger ones.

The function value of the systolic and diastolic waves, is to completely admix the contents of the arteries, preventing separation into distinctive substances. This continual mixing process, insures the presentation, at the winking valves of the capillaries, for extrusion, of a homogeneous liquid.

The vasomotor impulse, acting not only on the tissues of the artery but upon its contained liquid, projects the blood, already in the artery forward, making room for that projected from the ventricle, which constantly follows it ❧ It will be seen that this process, regardless of the quantity of blood in the body, within the limit of normal variance, serves to keep constant pressure at all of the capillaries, sufficient to keep them constantly distended and full of blood.

The capacity of the capillaries, it is estimated, represents the proportion of four hundred to one with the arteries.

In this connection it must be remembered, that the flow of blood in the main arteries, especially those near to the heart,

is very rapid, representing twenty inches in a second, while the flow of blood in the small arteries is very much slower. In the capillaries it is exceedingly slow, and indeed at times is, for short periods, substantially at a standstill.

When the function of blood, at the capillaries is recalled, that of extruding, through the winking valves of their walls, the nutritive elements, of plasma into lymph spaces, it will be understood why, blood at these places flows so slowly. From almost standing, or at most, slowly moving blood in the capillaries, blood in the veinules, flows more rapidly and continues to increase, in the rapidity of its current till it reaches the heart. Blood in large veins flows rapidly.

In normal conditions the diastole and systole of the arteries end with them and are not observable in the capillary or vein. However, that such a vibratory influence is in the capillaries and veins, is proven by the fact, that in certain abnormal conditions, they present such pulse-like movements in a perceptible degree.

As a result of the continued movement of the walls of the artery, together with direct impulsion from the ventricle, and also the influence of the vasomotor stimulus upon the blood, the pressure rises to such a remarkable height, that if one of the large arteries is perforated, especially at some distance from the heart, the blood will spurt from it to a height of some feet, and the impulses of the stream will be seen to correspond, with the systoles and diastoles, of the ventricles and arteries.

If a capillary is opened, the blood oozes from it slowly. If, on the other hand, a small vein is opened, the blood runs from it slowly; but if a larger vein be opened, the blood runs much more rapidly, but would only rise, in a tube of the same size, a few inches from the vein.

The explanation of this phenomenon is, that the functional relation of blood to the tissues of the body, is at the capillaries, and from them back to the heart force sufficient to move the blood, is all that is required. Therefore, the vasomotor stimulus is only a little more than sufficient to insure that function.

In this connection it should be remarked that muscular activity over the arteries, veins and capillaries of the body, so far from aiding in the flow of the blood, actually has a tendency to retard its flow.

The phenomenon of increased flow of blood, under muscular exercise, applies equally to all vessels of transportation, being fully explained upon the basis of increased stimulus; the increased disintegration of cells, transfusing gases, etc., calling for an increased activity of all of the organs of supply ☙ The blood movement, being incident, as carrier to the supply process is increased in flow by the use of additional stimulus, and may be increased to the limit of nerve capacity.

The diastolic wave of the artery, has long been held to be the *pulse;* and it has also been held that counting the pulsations furnished accurate information as to the rapidity of the heart beat, which is generally approximately true; but it is the diastoles of the arteries that are counted, and not the heart beats, and under certain phases of occlusion, there will be marked variance in these.

SOUNDS OF THE HEART

Under the supposition that the heart is the principal organ of circulation it has long been the custom of therapeutists to place much importance and reliance upon the so-called *sounds of the heart* as a diagnostic feature.

Sounds of the heart are well enough, in their way for the Chiropractor, but from a diagnostic standpoint, are much lessened in prominence. The phenomenon, however, will continue to challenge attention of the human family always. Upon application of the ear to the thorax, directly over the heart two impulsive vibrations, or so-called sounds will be observed. ¶ One, which may be designated as *first*, being a dull and somewhat muffled sound, which may be illustrated by *lubb*, followed after an instantaneous interval, by a short flapping, or thudding sound, which may be illustrated by *dup*.

The impression one gets is that of hearing alternately, the syllables *lubb-dup—lubb-dup—*.

Considering these sounds, in relation with their pauses or intervals, the whole as occupying *ten periods of time*, the relation will be expressed as follows: The time occupied by the first sound is *four-tenths*; followed by an interval of *one-tenth;* followed by the *second sound*, occupying *two-tenths;* followed by a second pause of *three-tenths*. These are heard, or as properly felt, to be constantly repeated.

The *first sound* of the heart is that produced, by the *systole* of the *ventricles*, and the sudden closing of the *valves* at the auriculo-ventricular orifices.

The second sound of the heart, as described, is produced by the diastole of the auricles and arteries, rapidly closing the semilunar valves of each artery. This is completed, just before the beginning of the systole of the ventricles.

At every systole of the ventricles, the heart rolls to the right on its axis, projecting its apex against the diaphragm, thus visibly moving the wall of the thorax over it. This is plainly, seen in thin persons, but not so much so in those having a greater amount of flesh.

The normal pulse of an adult is about seventy per minute. This, of course, varies slightly in different individuals. Shortly before birth the pulsations are about one hundred and fifty. During the latter part of the first year about one hundred and thirty. During the third year about one hundred. At the seventh year about ninety. In decrepitude about sixty-eight. These figures, of course, are only approximations of individuals at rest, and presumed to be in normal condition.

¶ The posture of the body, has much to do with the pulse. The more energy expended, to sustain a position, other things being equal, the more rapid the pulse.

The movement of the blood, presents many temptations to speculate, and this, especially, because it has been a field of such extravagant theory.

The foregoing, however, will be found sufficiently comprehensive, to include all that is positively known with respect to blood movement and will be sufficient to answer all the purposes of the student of function, at least for the present, and until opportunity for further proof has been had.

CHAPTER NO. 34

Physiology of Respiration

ANATOMIC SYNOPSIS

THE respiratory system consists of tubes, the ventral nares, nasal meatus, dorsal nares, nasopharynx, isthmus of the pharynx, oral pharynx, larynx, bronchial tubes, bronchioles, alveoli and infundibula; and, in addition to these, the parenchyma or substance of the lung proper. Accessory to these the mouth should be mentioned.

It will be observed, that the different parts of the nose are, from the respiratory standpoint but tubes. Behind the nose, the superior chamber of the pharynx and the isthmus of the pharynx, are really but another tube leading to the oral pharynx which lies behind the mouth, thence through the rima-glottis into the larynx, which is the tube leading to the trachea or wind-pipe.

The larynx is also, the organ of voice, and is important in that it shapes the column of air, to strike down through the center of the trachea, which is a musculo-membranous tube composed of cartilaginous rings, so that it always remains patent, extending to its bifurcation on a level with the fourth dorsal vertebra, where it divides into the right and left bronchi, the right bronchus being about one inch long, the left one, about two inches long; these extending into the lungs respectively, branch into the bronchioles and end in the atria, which contain the alveoli and infundibula, through the walls of which, and the pulmonary capillaries, aeration is accomplished.

The lungs are two in number, and occupy respectively, the right and left thoracic cavities on each side of the mediastinal structures. The right lung is divided into three lobes, the

left lung into two lobes, the right lung being about one inch longer than the left.

The bronchus of each side, together with the bronchial artery, the pulmonary veins, the pulmonary nerve trunks, lymph vessels, etc., compose the roots of the lungs.

The lungs are enclosed by a membrane, called the *pleura*, which turns back from the roots of the lungs onto the walls of the thorax, enclosing, and lining the pleural cavities so

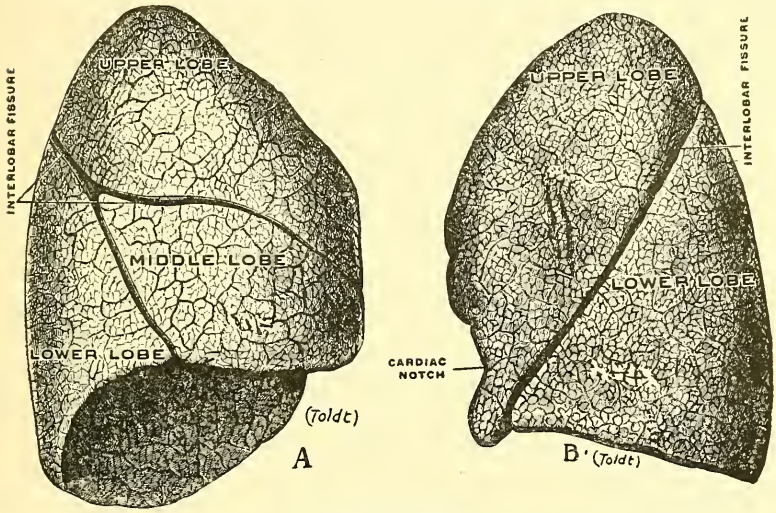


Fig. 32—The Lungs

A, showing the right lung, its lobes and fissures; B, showing the left lung, its lobes and fissures.

Nerves—The lungs are ramified from the seventh and eighth cervical trunks and from the first, second, third and fourth thoracic trunks. They also receive nerves from the pneumogastric trunks, and incidental ramifications from all of the thoracic trunks, to the twelfth.

PHYSIOLOGIC ANALYSIS

The atmosphere is a composition of oxygen, nitrogen, carbon dioxide, and watery vapor, with many other unknown gases and substances. The principal gases, however, are found to

be nitrogen and oxygen in the relation of four parts of nitrogen to one of oxygen; the other gases and substances being in small quantities; the watery vapor changing materially, with temperature, altitude, and nearness to extensive evaporation. However, fluid is an essential to atmosphere.

Respiration is that process, by which certain elements of the atmosphere, are carried into the liquids of the body by transfusion, through the intercellular spaces of the walls, of the alveolar ducts, alveoli and infundibula of the lungs, and certain gases are in like manner passed out through them. The machinery for respiration has been briefly described in the anatomic synopsis of the respiratory organs.

The atmosphere is properly taken into the body, through the *nares*, but is occasionally, and too often, taken through the mouth. In either event, it passes into the pharynx, thence into the larynx, and into the trachea, bronchial tubes, bronchioles, alveoli and infundibula.

The passage of air to the extremities of the infundibula is called *inspiration*. The return from the air passages out of the body, is called *expiration*. The processes of inspiration and expiration are performed by the combined activity of very many muscles.

Expiration is completely finished, by a muscular impulse, that reduces the lung in size, and lessens, from the alveoli and infundibula, all of the air passages, and by a reduction of the thorax.

When the limit of expiration is reached, which it must be understood never excludes all of the air from the lungs, a reversed activity is set up by the same and additional muscles ☙ ☙

The muscular walls of all the air passages in the lungs undergo dilation, the lungs expanding with the thorax in advance. This is accomplished by the muscular elevation of the sternum, the increase of the spaces between the ribs, by the action of the intercostal muscles. Also by projecting the dome of the diaphragm feetward.

In addition to the muscular operation in expiration, there is a wave-like movement or impulse of the air tubes of the lungs,

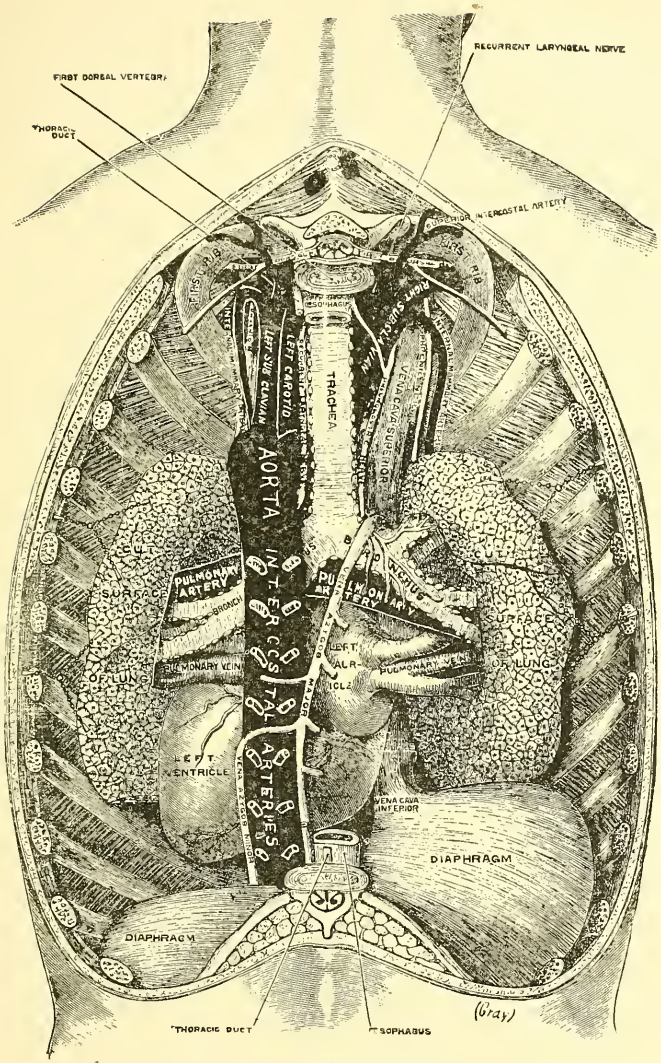


Fig. 33—Roots of Lungs from Behind

The student should note, that the vertebral column, from the first to the eleventh thoracic is removed. A large portion of the dorsal part of the lungs has also been removed, showing the dorsal muscular aspect of the *bronchi* and *trachea* and the position of the thoracic aorta, *pulmonary arteries* and *pulmonary veins*. This is a good cut from which to study the *diaphragm* and *heart*.

extending throughout the trachea and bronchial tubes, aiding inspiration. The nostrils are enlarged, the orifice of the larynx relaxed, the chink of the glottis distended, the muscles of the trachea and bronchial tubes relaxed to their infundibular extremities, and the tubes dilated, throughout their length. ¶ It will be seen, that it is of first importance, that there are no obstructions to the breathing process.

The points at which obstruction may occur, without the use of artificial means, are the *nares*, especially the dorsal nares, the *larynx* at the epiglottis, or in the *rima glottis*, between the vocal cords, which may be tightened or loosened, by muscles arranged to move the cartilages to which, the vocal cords are attached, so constricting them as to close the passage between them; the trachea and bronchial tubes by constriction of their walls and by exudations, clotting together and clinging to the walls.

Substance clinging to the walls particularly applies to the bronchioles, alveoli and infundibula, which may be in this manner closed. Constriction of these tubes is greatly facilitated, by abnormal constriction, or constriction with fixation of the thorax, which, of course, includes the diaphragm &c.

There are several terms in connection with respiration which may be used with some value in description. These are adopted from the standpoint of the individual at rest and are:

¶ (1) *Tidal air*, which is the quantity habitually or uniformly changed in each act of breathing, being estimated at 30 cubic inches in the normal adult.

(2) *Complemental air*, which is the quantity over and above tidal air which can be drawn into the lungs in the deepest inspiration. This amount, it will be readily understood, varies greatly, the average perhaps being nearly 100 cubic inches &c.

(3) *Reserve air*, which is that left in the lungs after the ordinary expiration, will also vary much in different individuals, the average being in the neighborhood of 200 cubic inches &c.

(4) *Residual air*, which is the quantity that still remains in the lungs after the most profound expiratory effort. This amount will greatly differ, in different individuals, and can in no sense be accurately estimated.

(5) *Respiratory capacity*—This is indicated by the quantity of air which an individual at rest may expel from the lungs by the most forcible expiration following the deepest inspiration possible. This, like all other estimates, will vary in the normal adult, being about 250 cubic inches.

The amount of air which passes, into and out of the lungs, in an adult at rest, in twenty-four hours, is said to be about 686,000 cubic inches, which, of course, will be greatly increased by excitation.

The amount of air used, by a hard-working laborer, being estimated at 1,568,390 cubic inches. These estimates are without value to the student as actualities, but furnish an excellent basis as a reasoning hypothesis.

The process of respiration is to bring certain elements of the atmosphere into the body, and to carry certain elements out of it, and since, at rest the amount of air used is found to be remarkably less than that used in activity, the necessity for certain activity is fully established.

The amount of exercise must be governed by other laws, which will be noted at other parts of this work.

The object of respiration is: (1) to carry into the body economy, oxygen and certain other substances not known and, (2) to carry out of it carbon dioxide and some other substances which are not known, and since this transfusion is constantly, essential to the organism, it is of primary importance to understand how this function is accomplished ☙

It must be recalled in this connection that there is not sufficient air *inhaled* or *exhaled* at one time to *fill* or *empty* the lungs, but that there is a volume of air constantly in the lungs which the physiologists term *stationary air*, which term, however, is erroneous.

It must be understood that the air tubes of the lungs, to their extremities are constantly in a *vibratory movement*, keeping their contents in activity, and therefore in process of function. ¶ Air added by inspiration, intermingles with the contained vibrating air by diffusion, and the expiratory air passes by a process of exfusion; the oxygenated and carbonated air remain in distinct volume and pass by each other.

It will, however, be seen that as a result of this operation, there is pressed against the mucous lining of the air cells and infundibula, a volume of air, which is constantly seeking a pathway of escape, urged on by the expansion of the lung substance, thorax, and incoming air, during the whole process of inspiration.

Throughout the entire lining of the air cells, and only separated from the air itself, by the most delicate membrane, are the lymph spaces of the intertubular tissues, constantly filled with lymph. Through the intercellular spaces of this thin membrane oxygen, borne in a small quantity of atmospheric fluid, escapes into the intercellular or intertubular lymph ❧

At the termination of inspiration the whole muscular and atmospheric operation is reversed; the air pressure is withdrawn from the walls of the alveoli and infundibula, during the entire period of expiration, thus permitting the escape of carbon dioxide, borne in a small quantity of lymph through the intercellular spaces into the alveoli and infundibula ❧ ❧

The lymph spaces transmit oxygen thus received, through the so-called winking valves of the walls of the immediately adjacent pulmonary blood capillaries. The lymph carries the carbon dioxide, from the blood through the winking valves of the capillaries, into the adjacent lymph spaces, that intervene between blood capillaries and air cells of the lung lobules ❧

The elimination of carbon dioxide and the oxygenation of blood, after the manner described, is called *aeration.*

From the facts stated it will be observed that the process of respiration is four-fold in its purpose. That is to say, it accomplishes *aeration*, *depuration*, *nutrition* and *absorption*, which are discussed under separate heads.

CHAPTER NO. 35

Physiology of Kidneys

ANATOMIC SYNOPSIS

THERE are two kidneys, situated in the dorsal wall of the abdomen under cover of the peritoneum; each held in its muscular seat by the fatty capsule. Each kidney is covered with a fibrous capsule. The right kidney is about an inch lower than the left.

The right kidney lies in the space between the intercostal area of the eleventh and twelfth ribs, and the headward margin of the fourth lumbar vertebra; it lies behind the transverse colon, mesial to the hepatic flexure, dorsal to the gall bladder, and lateral to the duodenum.

The left kidney, about an inch lower than the right, is dorsal and mesial to the splenic flexure of the colon.

The kidneys are about four and a half inches in length, two and a half inches in breadth, and one inch in thickness. On the mesial border of each kidney, which is also the vertebral border, is a deep fissure, called the hilum.

In the hilum lies the pelvis of the kidney; and extending into the hilum outside the pelvis of the kidney are the nerves and arteries to the kidney. And in the same relation, veins and lymph vessels extend out of the kidney.

The extension of the pelvis, beyond the kidney, is called the ureter. The ureters extend from each side respectively into the urinary bladder. The outside part of each kidney is called the cortex, which is considered as being divided into pyramids and cortical columns. The inner part of each kidney is called the medullary center.

Throughout the cortex are situated tubules, for the excretion of urine. These tubules extend up the pyramid toward the

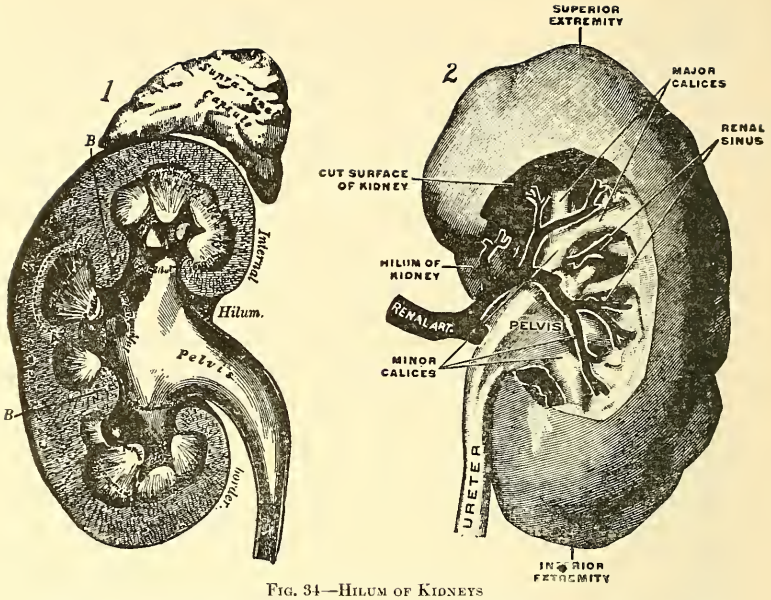


FIG. 34—HILUM OF KIDNEYS

1, shows half of kidney with *pyramids*, *cortex* and *cortical columns*, *sinus* with the *papillae* and the *pelvis*, also the *suprarenal capsule* in position; 2, shows kidney with the part removed to disclose tissues in sinus, towit: the pelvis with the emerging tubules and the artery. To this, in imagination, the student must add the veins, lymph vessels and nerve trunks.

pelvis of the kidney to the calices, through which they extend into the pelvis of the kidney; these are called uriniferous tubules, or the tubes of Henley. ¶ The renal arteries are very large, compared with the size of the kidneys, showing the value of function of the kidneys, to the general organism ☙ Nerves—The kidneys are ramified from the twelfth, eleventh and tenth thoracic trunks, and nerves from the same source ramify the entire uriniferous tract.

PHYSIOLOGIC ANALYSIS

The office of the kidneys is to separate, from the lymph that is extruded from the blood, certain elements which, in their united state, are called urine.

Urine consists of water holding normally in solution, certain organic and saline substances, with many other substances,

during abnormal processes, of the body. The proportions of these substances have been approximated, and so far as an analysis of morbid substance can be accurate, are of some value, and are therefore given. ¶ The relative proportions in one thousand parts are estimated to be as follows:

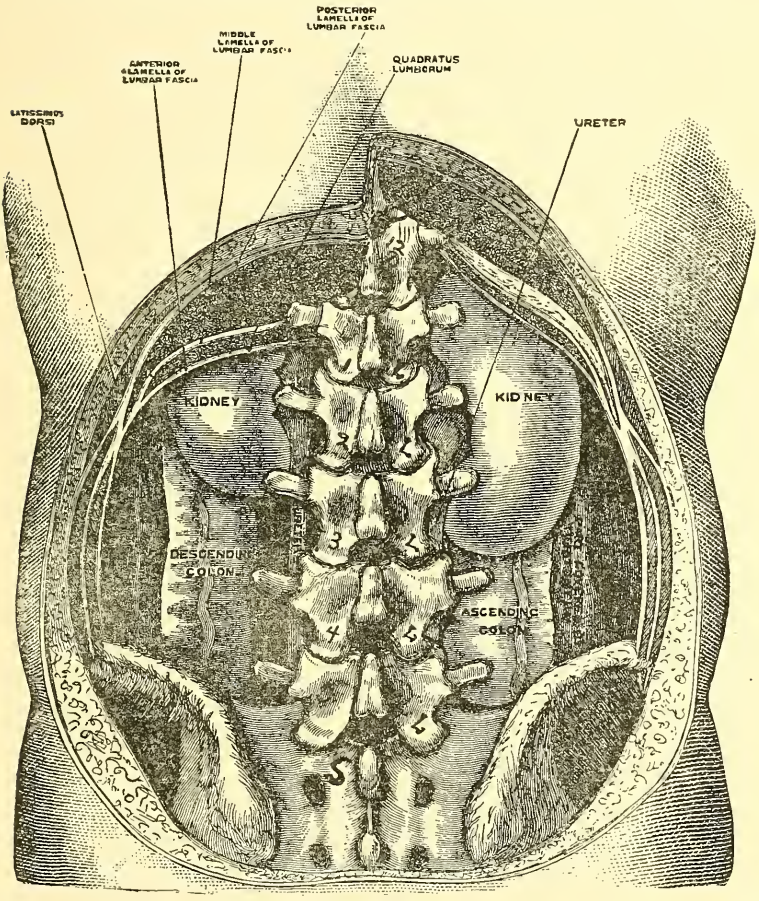


Fig. 35—Kidneys from Dorsum

The student will observe that the lumbar region of the body is cut away to disclose a portion of the twelfth dorsal, the first, second, third, fourth and fifth lumbar vertebrae and the upper portion of the sacrum. The kidneys are in splendid relative position. The ascending colon, however, should be to the right, the full width of itself, and the descending colon, nearly so, to the left.

The student will carefully place these according to description but will fix the relative position of the kidney to the innominates as being about usual.

Water	967
Solids	33

The solids consist of the following substances:

Urea	14.230
Other nitrogenous crystalline bodies, uric acid, principally in the form of alkaline urates, a trace only free; creatinin, xanthin, hypoxanthin, hippuric acid, mucus, pigments and ferments	10.635
Salts, inorganic; principally sulphates, phosphates and chlorides of sodium and potassium, with phosphates of magnesia and calcium, traces of silicates and chlorides	8.135
Salts, organic; lactates, hippurates, oxalates, acetates and formates, which only appear occasionally	

Sugar, in varying amounts; gases (nitrogen and carbonic acid principally).

It must not be thought that the constituents of urine, as given in the foregoing table are a reliable criterion, as to the conditions of the body, and it is not for that purpose that this table is given; but to give some hint as to the extensive scope of elimination of by-products, that is accomplished by the kidneys, and therefore to bring to mind the very great importance of the function of the kidneys, and the importance of an accurate knowledge of that function.

The kidneys are very richly supplied with aerated blood through the renal arteries. The volume of this blood is very great in proportion to the size of the organs. It contributes to a dual function in the kidneys.

In its primary or first system of capillaries the blood furnishes to the substance of the kidney, through the medium of the lymph, nutrient properties. At the termination of the capillaries, having charge of this office, small veins are formed which break up into capillaries in the cortical portion of the kidney, and extrude the lymph from which urine is extracted. At their termination they again form veins which finally con-

centrate to form the renal vein. This double capillary system may be said to be analogous to the portal blood system in the liver ☙ ☙

The blood in the second system of capillaries, is brought into very close contact, through the very delicate walls, with the cells of the kidney.

External to the capillaries, and indeed all around them, are lymph spaces into which they extrude lymph, carrying with it the substances to be acted upon by the cells of the kidneys ☙ ☙

The lymph spaces, being also intercellular spaces, contain these substances, in immediate contact with the substance of those cells, sufficiently long for the function of separation or excretion to be performed, and it is by reason of the forces acting through these cells, that the depuratory elements are separated and impelled into the *tubules of elimination*. It will also be seen that in this process, certain by-products, especially carbonic acid, are carried through the winking valves of the capillaries, and finally into the renal vein, and are thus carried through the body generally.

Certain residuary solids are carried away to the body through the lymph vessels themselves. These substances enter into other chemical elaborations, so that the kidneys are organs of *affirmative function*, and not *excreting organs* only.

That portion of the chemicals contained in the lymph, that is extruded through the winking valves of the blood capillary walls into the lymph spaces, is collected in those spaces, and finally enters the uriniferous tubules and is thus carried through the calices into the pelvis of the kidney, and thence through the ureters into the urinary bladder and finally through the urethra out of the body.

The process of excreting urine is continuous in the kidneys, hence the bladder is a very important reservoir, since without it, urine would always be flowing from the body.

The volume of excretion is variable; but is usually greater during periods of exhilarated liquid movement. It is also greatly increased, by taking large amounts of liquid, either as a beverage or food. Generally speaking, the amount of urine

excreted is reduced, by continuous eating of solid foods and abstaining from liquids.

The excretion of urine, however, varies in different individuals, under any phase of diet, and differs in the same individual in the same way, depending on the conditions, and functional processes.

The excretion of urine is greatly reduced, during periods of rest, and especially during sleep.

From the bladder, by the relaxation of its sphincter muscles at its urethral orifice, sometimes termed the neck of the bladder, the urine discharges through the urethra by virtue of a muscular activity in its walls, much like peristalsis, aided by the constriction of the bladder and certain muscles of the abdomen.

The urine of a normal individual is a salty, clear, amber colored liquid, with a slight odor, and acid reaction; its specific gravity is about 1020.

Instantly upon being voided, urine changes its chemical composition, and the inaccuracy of approximations based upon an analysis of it, are in proportion to the time that elapses between its leaving the body, and that of the analysis, and the degree of chemical change incident to its abnormal consistence ☙ ☙

The normal amount of urine passed in a given period must, of course, vary, not only with the health of the individual, but very largely with the diet and activities. It has however, been estimated to be about *fifty-three fluid ounces* in an average sized, normal adult in a period of twenty-four hours. ¶ The urine may be found to contain, as a result of certain excesses, or errors in food selection, the following substances: Serum-albumin, globuline, ferments, proteoses, peptone, blood, sugar, bile acids, pigments, casts, fats and various salts and micro-organisms, and many other substances which have not been isolated.

CHAPTER NO. 36

Physiology of Skin

ANATOMIC SYNOPSIS

THE skin is an organized tissue that covers the periphery of the body.

The linings of the tubes and vessels of the body are really skin also, but they are classified under mucous and serous membrane, and are sufficiently discussed under that head ❧ ❧

Mucous membrane, is that skin which lines tubes and cavities exposed to the air, while serous membrane is said to line tubes and cavities not exposed to air. In other respects these membranes are alike and, mechanically, are not dissimilar in any respect from the skin.

The skin consists of two layers; the dermis or true skin and the epidermis or superficial skin. Occasionally these are called respectively *cutis vera* and *cuticle*. The skin is a tough flexible, contractile and highly elastic structure; it consists of fibrous connective tissue, with a rich admixture of uncolored muscle and elastic fibres. It is richly supplied with blood and lymph vessels in its deeper parts, and also with nerves ❧ The superficial parts of the skin are not supplied with blood vascularity at all and nerves do not extend into it; all parts of it, however, that are animate are stimulated from near nerve terminals, and has lymph movement. The deep layer of the skin, contains sebaceous glands, sudorific glands and hair follicles. These are the sweat and oil glands of elimination and for occupancy of the roots of the hair.

The appendages of the skin are said to be the hair and nails. However, since these are but differentiations of skin, it is hardly correct to so classify them.

The skin is occupied by little tubules that extend to its surface, and excrete fluid, liquid and oil. These are especially, richly aggregated in the axilla, groin, palms of the hands and soles of the feet. They are much less thickly, but nevertheless, are found thickly placed all over the skin. The total number, for the skin of an average adult is estimated to be 2,381,248. The combined area of these is estimated to be, eight inches square

The arteries and veins of the skin represent, substantially all of the arteries and veins of the body.

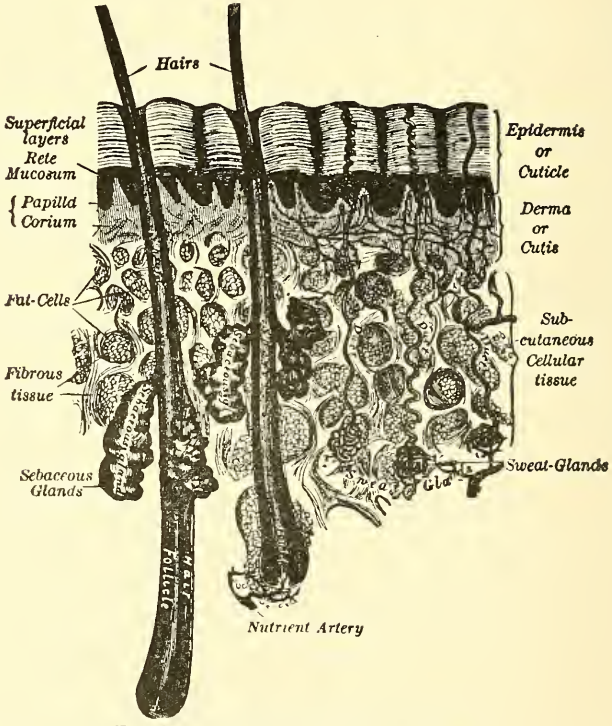


Fig. 36—Section of Skin Greatly Magnified
Cut discloses hair follicles, sebaceous glands, sweat glands and the various layers of the skin.

Nerves—The nerves of the skin represent the periphery of practically all nerve trunks of the system. Nerves reach the

skin by being arranged through the subcutaneous, areolar tissue, which attaches the skin to the subjacent body ☙

PHYSIOLOGIC ANALYSIS

The skin must be considered as being a part of the body. It has been treated by physiologists as though its relations, to the organism generally, were somewhat distant, not to say indistinct ☙ ☙

The skin performs to the body several very valuable offices. That is to say, it is an organ of touch, protection, depuration, osmosis and perhaps beauty.

The skin is the principal organ of touch, or at least it is so classified in the physiologies. A careful analysis of this term, however, will disclose it to be erroneous for it will be found, upon the removal of the skin that the underlying tissue has much more acute sensibilities than the skin.

It is not in this sense, however, that the classification is made, the name organ of touch, being applied to the skin, without thought as to relative function.

The skin contains the *periphera* of a very great number of so-called *sensory nerves*. These are not equally distributed over the skin, but are thicker at those points where apprehension is most needed and thinner at other parts of the skin. The rich aggregations of sensory periphera do not, as would at first be thought, occur more thickly upon the delicate parts of the skin, but occur in places, to fill certain specific offices, without regard to the texture of the skin at such places ☙

The skin of the *palmar surface* of the hands and *plantar surface* of the feet is very thick and tough, but it is richly supplied with sensory nerves.

The skin of the nipples and lips is very delicate, yet for functional purposes it is also very richly supplied with sensory nerves. This law is carried out throughout the whole skin ☙

The ability of apprehension, through the sensory nerves of the skin, like any other brain function, can be greatly disciplined, as is proven by the touch of the blind, and by the accuracy, with which a person that has had much practice

can locate a point touched upon his back, a power which is scarcely possessed in any degree by individuals that have not practised such location.

It will be found that sensory nerves, to the skin, are very largely, if not entirely, derived from the vertebral trunks, which ramify the immediately subjacent tissues of the body. In this connection it must not be forgotten nor overlooked, that sensory nerves sometimes extend for great distances, and are not always confined to the immediate area of the general ramification of the trunks from which they are derived.

It will be understood, that in addition to other numerous functions, which the quality of touch facilitates, not the least is protection, which properly comes under that head. Without the quality of touch the skin could be very greatly injured, by exposure and different forms of contact, and the individual not know it.

The skin protects the body through the medium of touch by preparing the underlying tissues, as well as itself, by motor reaction for all sorts of blows, jolts, and jars. Being a highly elastic and muscular organ, not rigidly, but loosely attached to the underlying tissue, the skin is by its very adaptability, a very important protection.

At parts of the body constructed to come into contact with the rigor of environment, such as the shoulders, back of the neck, upper part of the back, the scalp, the dorsal surface of the sacrum and gluteal region, the ventral surface of the thorax, the elbows and knees, palmar surface of the hands and plantar surface of the feet, the skin is thick, tough, heavy, and so constructed as to compensate in protection for that lost by the necessities of form.

In those parts of the body where, by their shape, the skin is protected, it is thin and protects the parts it covers, by its great adaptability to changes of position.

The so-called appendages, especially the hair and nails, furnish perhaps its strongest element of protection to the parts covered. These are usually the head, axilla and pubes. To these must be added the beard on the face of the male,

hair on the breast, and incidental growths of hair on various parts, of both male and female.

The beauty of the skin need not be discussed further than to say, that the term beauty is but the name of a mental habit, which has been formed, because of the numerous relationships of the skin, with emotional idealism. Without understanding why, probably the great majority of human beings think, that certain parts of the skin, such as the cheeks, brow, throat, hands, etc., are beautiful, and in so far as an inaccurate term can be applied, one of the attributes of the skin is beauty

It must be remembered, however, that the skin, by itself, is far from beautiful. It is only association that makes us think the skin, as to any part of it, is beautiful.

The principal function of the skin, however, is elimination. This function is accomplished by the *sudorific* and *sebaceous* glands, which have been described in the anatomy of the skin

Ordinarily the function of these glands are described separately as though they were separate and distinct functions. This, however, is a mistake, for while elimination from the sebaceous glands, is largely of an oily character, and that from the sudorific glands largely water, yet the function of each is to eliminate substances no longer usable in the economy of the body.

Excessive eating, will produce an excess of substances, to be eliminated through the skin.

To recall the description of the lymph system, and the fact that it has a system of terminal ends in the skin, and that from the places of assimilation much colloid is not returned into the blood, but is carried to certain channels of elimination, will be to understand how such substances reach the skin and are excreted, through the sebaceous and sudorific glands, from the body.

Both the sebaceous and sudorific glands are parts of the lymph system. The chemicals eliminated through them, go very widely, into all of the by-products formed in the laboratories of the body, and of course, vary in a remarkable degree

in different conditions. The elimination through the sudorific glands is technically called *perspiration.* Perspiring is a continuous process. Ordinarily the fluid eliminated, evaporates as rapidly as it is presented to the surface of the skin, and therefore exists without the knowledge of the individual and in that sense may be called *insensible perspiration.*

Under proper conditions, such as heat, moisture, and exertion, perspiration is eliminated so rapidly, that it accumulates in liquid upon the surface of the body. This liquid is, *sensible perspiration*, properly and technically called *sweat.*

There has been an attempt on the part of physiologists to analyze sweat and to declare its consistence. The sweat of each individual is as distinct, from that of any other, as the individual is distinct, and it will be understood that this exudation will differ widely, never being found of the same consistence in two individuals, or in the same individual at different periods, but varies constantly with the physical condition of the individual, influenced by the normal or abnormal operation of other organs, and also by substances ingested, activity, or the lack of it, etc.

The analysis given aids us in forming an approximation, and in that sense is of considerable value. Of a thousand parts it is said to consist of:

Water		995
Solids, organic acids (formic, acetic, butyric, propionic, caproic, caprylic)	0.9	
Salts, chiefly sodium chloride	1.8	
Neutral fats and cholesterin	0.7	
Extractives, (including urea) with epithelium	1.6	5
		1000

Sweat is a clear, or amber colored liquid, which may be neutral, alkaline, or acid in its reaction. It usually has a saline taste and always has a peculiar characteristic odor which is markedly changed, with all abnormal processes of the body, in which sweating occurs, or can be produced.

In the more usual phases of abnormality, these odors can

be learned, until they can at once be detected. They chiefly arise from the elimination of carbonic acid and uric acid. The quantity daily eliminated as perspiration or sweat, varies from one to ten pounds. It will be clearly seen that these amounts are only stated as approximations, since there is no method, by which, this elimination can be measured with anything like accuracy.

The volume of elimination from the body is very excessive in certain, abnormal processes, its suspended solids being much increased in proportion to the eliminated water ❧ The sebaceous excretion contains a greater proportion of solids, than the sudorific, which are principally disintegrated cells with oily substances, carrying with them much of the same chemicals found in the sudorific excretion, which give to sebaceous substance a peculiar changing odor, concerning which the same is true, as of the sudorific excretion.

The substance of these excretions is projected from the blood, through the winking valves of the capillaries, into the lymph spaces, where it receives contributions from immediate disintegration, and is conveyed into the canaliculi and other vessels of the lymph system, through which it finally reaches the glandular apparatus of the skin, by the function of which it is passed to the surface, or from the body.

This elimination is a means of carrying off an immense amount of heterogeneous substances from the tissues of the body ❧ ❧

The liquid upon the surface, exercises a marked tendency to cool the body. The principal value of the elimination, however, is the removal of substances, no longer of value to the organism, therefore foreign and dangerous to it.

It has been said that the skin is endowed with the power of absorption. The skin has no such power. It is, however, quite clear that under certain abnormal processes many substances can enter the body through the skin.

It is quite clear that before entrance can be accomplished, through the skin, its external portion must be either removed, or rendered powerless to perform its resisting function; for substances, in order to enter the body, through the skin,

must reach the lymph system, by the process of endosmosis, or paralysis of the external walls of the sebaceous and sudorific glands.

The rapid entrance through the skin of powerful drugs, such as alcohol, is performed in this way.

CHAPTER NO. 37

General Depuration

DEPURATION is the name of that process, or series of processes, by which substances that are disintegrated, and those that can not longer be used in the economy of the body, are carried toward some of the exit orifices, and finally ejected through, one or more of them, from the body. Depuration is a continuous process. However, a depuratory substance is not necessarily conveyed in the direct line of depuration, until eliminated from the body, but it may enter into one or more functional combinations, or elaborations in the various glands, on its way to elimination from the body.

Perhaps the most marked illustration of delayed elimination of depuratory substance, occurs in the blood in the radicles of the portal vessels, that is known to be peculiarly loaded with by-products, or depuratory substances which, because of their peculiar properties as such, are fitted to enter into elaborations in the liver necessary to the production of bile, glycogen, and uric acid.

The depuratory substances contained, in the composition of the bile, pass directly with that elaboration, into a direct channel of elimination, through which the elements of it, that are not absorbed are finally eliminated. However, much bile is absorbed from the intestine.

The uses of glycogen, and uric acid, are not known independently, but it is known that they enter into certain important elaborations necessary to the production of normal tissue, after which their residuary, depuratory elements, are eliminated, principally through the kidneys and lungs, and to a considerable extent through the skin.

Depuration is everywhere in the body, in every atom of

tissue, it always immediately precedes assimilation, and by its office, prepares the way for assimilation, for it will be seen that the disintegrated elements of cells, or cells themselves, which constitute morbid liquid solids, must be removed before they can be restored or replaced with new parts. Therefore, in this limited sense, depuration is primary, to assimilation. Again this office is performed in less than microscopic spaces, under the intelligent propulsion of nerve stimulus, by a process, which is readily understood, but is not known in a machinic sense.

By that force and process, depuratory elements are separated, and directed into lymph canaliculi, from which gaseous elements pass, into the blood by transfusion through the capillary walls, while the remainder is carried, through lymph channels to other points of entrance into the venous system.

¶ From these interatomic, less than microscopic points, of such vast number as to be incomprehensible, the various elements finally, through the lymph and blood systems, reach one of the four great channels of the body which are classified as depuratory organs. Each of these, by the way, has numerous other functions aside from that of depuration.

It will be understood that depuratory elements, therefore, may pass through the lymph and blood systems several times, before finally reaching the depuratory system, that primarily has charge of eliminating that kind of substance. These four systems are: The *alimentary canal*, the *respiratory system*, the *urinary system*, and *skin system*.

ALIMENTARY SYSTEM

The alimentary canal has not usually been considered as a depuratory organ throughout its extent. Physiologists refer to the intestines as depuratory organs. This classification, however, is not sufficiently inclusive. Many substances are taken into the mouth, which, by reason of their consistence, can not enter into the economy of the body, and therefore are only taken as depuratory elements.

The reference is to marbles, pieces of metal, such as money,

etc., as well as to certain other substances which are taken as food, such as the skins of certain fruits, and grains, and like indigestible substances.

It must also be remembered that the whole alimentary canal, is the place of discharge, of depuratory mucous glands, so that really from its very beginning to its ending it may be classified as performing the office of a sewer to the body, in that it constantly receives and carries elements for depuration only.

It is true that the amounts of depuratory matter, are materially augmented in the intestine, but that does not in any sense lessen the force of what has been said.

It will be remembered also, that through the alimentary canal, the accessory glands of digestion, the salivary at the mouth, the gastric glands at the stomach, the spleen, liver, and pancreas at the intestine, discharge certain elements that are wholly depuratory, into the alimentary canal.

RESPIRATORY SYSTEM

The lungs furnish an area for the depuration of gases, contained in a small quantity of fluid, which can no longer be used in the economy of the body.

It must be explained that the term lungs here is not sufficiently comprehensive, but that all of the air passages, in the lungs and from them, to the external orifices, which are the mouth and nostrils, must be included.

The depuration from the respiratory tubes aside from gases, is very important, and is some character of mucous discharge, no matter by what name classified.

URINARY SYSTEM

The kidneys are depuratory organs, the elements depurated, and the method of depuration also, is sufficiently described under the physiology of the kidney. To this statement the explanation should be added, that the areas of depuration, in the kidney are less than microscopic, and that function is performed without any known machinery.

Again, while the kidneys are mentioned as depuratory organs, it will be understood that, this must also include their tubes of elimination, the ureters, bladder, and urethra, to the external orifice of the body. Here again the mucous exudations, are a prominent element of the depuration.

SKIN SYSTEM

The skin is a depuratory organ, and this includes not only the *integument*, but the *mucous* and *serous membranes*. Depuratory substances from the latter reach very largely, the alimentary canal, the tubules of the kidneys and the air tubes of the lungs, in quantity, in the order named. The integument performs the office of depuration, to what might be called the *superficial body*. That is to say, generally speaking, its eliminations are from itself, and the subjacent tissue.

It will be seen, however, because of the very extensive area of the skin, the opening for depuration alone being estimated to form a combined area, of eight inches square, that its function is very extensive, and because of its extension over certain thin parts of the body, its depuration is almost comprehensive of the elimination from such parts. Reference is to the hands and feet, the scrotum, the ears, the nose, and such other isolated portions of the body.

The substances depurated, through the four channels, pass under specific names. Those from the intestines, *feces;* from the lungs, *fluids*, *gases* and *vapors;* from the kidneys *urine*, and from the skin, *perspiration*, *sweat* and *sebaceous* substance. ¶ The names given in the preceding paragraph, however, are in no sense comprehensive, since under abnormal conditions, any depuratory organ, may eliminate almost any chemical known to the body.

It is a fact well understood, viewed in the light of the movement of the lymph and blood, that each depuratory organ can to a large extent, for a limited time, perform much of the function of others. This is an accommodation that aids much in abnormal processes of the body; but it must also be remembered, that it is destructive, under prolonged abnormality ❧

The depuration from the serous membranes, lining the vessels of liquid movement, is primarily into the liquids of such vessels and later through, one of the four, eliminating channels. In many phases of abnormality this becomes a very important factor in the process; morbidity sometimes accumulating in the capillary systems, in sufficient quantities to exert a profound irritation and motor reaction.

Depuration, from the lining membranes of the vesicles of the body, is into their contents and passes with the same, through their tubes of elimination, from the body.

CHAPTER NO. 38

Assimilation

ASSIMILATION is the process by which *inanimate chemical elements* are changed or converted into *animate*, tissue elements.

It is, of course, very clear that the process, of making animate, has never been seen, and is performed wholly without the office of any structure, which we recognize as machinery, and therefore, the manner in which this function is accomplished, from a mechanical standpoint, is not, and probably never will be, known. It is, however, easily understood.

To know the process of conversion of inanimate materials, into animate substances would be, to solve the mystery of the universe, and to fully understand original formation, to use the term of the dogmatist, or original emanation, to use the term of the evolutionist, both of which, in the last analysis, mean precisely the same thing.

In order to understand this function, it must be recalled that it is, without exception, performed in an area too small for observation, and in relation with disintegration, or original depuration. It is, however, quite clear that as to depuration, this was not true, as to the original formation of cells, but is true in the organism ever after.

It must be conceived that the area, in which these functions take place, is divided for that purpose, and that stimulus acts through these, in such a way, as to separate the elements for depuration, from those for assimilation and conducts each to its area, and at the same time, impels the elements, for assimilation to the proper place and into such relation, with other elements, that the elaboration produced, is of a consistence that stimulus, acting through the composite, results

in animation. The process of assimilation is constantly going on in every atom of the body, co-extensive and in relation with depuration.

Assimilation is the *primary function* of the entire organism, and is second only to the *reception* and *transmission of stimulus in the brain.* It is the process by which the organism was constructed from its beginning.

Assimilation is the process by which original material creation, emanation, or formation, took place, under the force of the same original elemental energy, and therefore every organ which has to do with the bringing of the minutest portion of nutriment into the body, is accessory to this function, and since it must have existed primary to every other function, even depuration is accessory to it.

Approximate analyses have been attempted of the juices of the various digestive points of the alimentary canal, and of the foods and liquids of the body, but of the substances entering into assimilation, the ultimate, all important, wonderful elaboration, no effort at analysis has ever been made, and it is possible that none will ever be attempted, because it can not be seen by anything so far invented, and to disturb the process, even though it could be seen, would be to destroy the consistence of the materials involved. It is therefore, at present, unknowable.

Assimilation is a function that is performed under the direct control of an intelligent, energy or force, without the intervention of mind, and therefore can only be understood, and in that sense known, by drawing upon the storehouse of intuition ☙ ☙

It has been demonstrated that assimilation is always normal, when there is undisturbed nerve stimulus radiating through organized channels, or nerves, and that it immediately becomes abnormal under occlusion of stimulus which, however, is no more true of the function of assimilation than, that of any other process of the body.

The office of assimilation, as we view it, is only the reconstruction of parts of cells following disintegration. However, when the mind is directed to the process of growing, it will be

seen there is, not only that assimilation, but that there is a constant exuberance of assimilation which, in addition to repair, constructs tissues in conformity with an apparent plan, or image, for the maturity of the organism, and for the accomplishment of many incidental things, needing temporary tissue.

The same phase of assimilation is also seen in lacerations and fractures and in those wounds where tissue has been to a considerable extent destroyed.

In such conditions, not only must the ordinary tissue cells be replaced and their elemental parts restored, but there must be an additional assimilation as nearly in conformity with the original plan, as the condition of the nerves, with respect to radiation of stimulus and other circumstances, will permit. In restorative assimilation, nerve tissue is always primarily composed, followed by other tissues in the order of their importance ☙ ☙

The *awesome phase* of assimilation comes home to the scholar, when he realizes that by these same *processes*, the particles of the cells of the *brain*, are replaced and restored while they are receiving and transmitting stimulus, and were so originally composed, by virtue of which process the whole phenomena of material, animal life is produced and maintained. The student should remember that his present ability to think, about these congeries of phenomena, is dependent upon the fact, that new particles are being, right now, woven into the cortical cells, in that part of his brain, where the portion of his mind, he is now using, is produced.

CHAPTER NO. 39

Physiology—Touch, Taste and Smell

ANATOMIC SYNOPSIS

Touch

THE organ of touch is recognized as the skin and has been briefly described in the anatomic synopsis to physiology of the skin.

Taste

The tongue is said to be the organ of taste. It is a very mobile organ and is a part of the mouth. It occupies the floor, between the rami of the mandible, and is about three and a half inches long, and has a body, base, and apex. A dorsum and venter, connected by a margin. The tongue is attached, by its root to the hyoid bone and epiglottis. The apex is the ventral point; the dorsum is what would be called the top. See cut of Tongue No. 15.

The tongue is constructed in two halves, connected by the median septum, to and from which muscles attach in every direction, so that the tongue may be moved in any direction. The dorsum of the tongue is covered with papillae or taste buds. Those occupying the tongue generally, but especially the tip third, are called the fungiform; those of the general dorsum of the tongue, filiform; those around the foramen cecum, circumvallate.

Nerves—The tongue is ramified by nerves from five pairs of cranial trunks, also from the third, and fourth thoracic trunks.

Smell

The nose is classified as being the organ of smell. It consists

of the outer or visible part, and the inner or nasal fossae. The outer nose is composed of bone and cartilage, which gives form and character to the face. It is covered with the nasal skin

The nasal fossae consist of two tubes, separated by the nasal septum and called the ventral nares, the nasal meatus, and the pharyngeal nares.

The nasal meatus is divided for function, into the olfactory, and respiratory portions. The mucous lining of the olfactory portion is very richly supplied with olfactory nerves.

The nose is supplied with muscles so that the column of air may be directed through the olfactory or respiratory portions at will.

Nerves—The nose is ramified from three pairs of cranial trunks; also from the second and third pairs of cervical trunks, and the third pair of thoracic trunks.

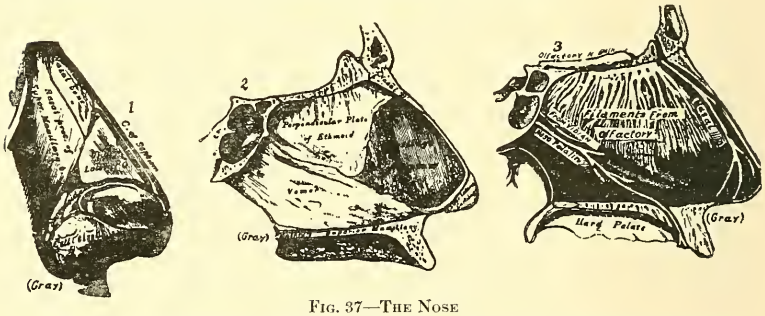


Fig. 37—The Nose

1, shows bones and cartilages of which the nose is composed; 2, shows median septum of nose. 3, shows ramification of olfactory nerves, schematically, of course.

PHYSIOLOGIC ANALYSIS

The physiology of the organs of special sense will be given briefly; the intention being to furnish a sufficient basis that the student may readily understand, not only the ultimates of the office of each organ, but to understand the general care of each and the phases of their abnormality.

Touch

The skin is recognized as the organ of touch and its physiol-

ogy has been given, generally under the physiology of the skin ☙ ☙

It will be sufficient for the purposes here to say that membrane covering a surface, whether such surface is outside or inside, is the organ of touch to surfaces immediately under it, where such membrane, is supplied with nerves of apprehension ☙ ☙

Membranes are supplied with the quality of touch only, where they serve as a protection, in what is ordinarily called feeling, such as is exhibited by the integument, or where a similar quality, acts in such way as to produce unconscious brain responses, which result in motor action, producing constriction and sometimes fixation.

This is true of extensive areas of mucous and especially of serous membrane. These areas are indicated in connection with either the physiology or pathology of the various parts of the body, and need no further remark at this time.

Taste

The tongue enters into many important offices carried on in and through the mouth. It is the organ of taste. It is also the organ of articulation. It enters into many offices as accessory. ¶ The tongue is one of the controlling factors in the production of the music of the voice, controlling as it does the direction and application of the column of air from the *rima glottis*, to the roof of the mouth, against the teeth, or from the mouth.

Much space could be advantageously devoted to this function of the tongue, but such a dissertation belongs to the department of voice culture, and will be passed here with the statement that to learn to control the tongue, in speech and song, and to never strain it, or incorrectly use it is one of the fine arts.

The incorrect use of the tongue, whereby the tissues of the throat are strained, often results in grave motor reaction and occlusion causing much abnormality in the tissues of the larynx and pharynx.

The tongue is also a very important organ of mastication.

Without it, that office could not be performed at all. It holds the food against the teeth from the oral aspect, it puts it into the vestibule and brings it back, and forces the saliva into the food and retains the food and saliva in such relation as to cause intermingling to take place readily, and when mastication is completed the tongue is the sole organ of *deglutition*.

The tongue as an organ of taste is of great value to us in the selection and rejection of substances for food, in the determining of temperature, and many other such offices.

The tongue needs no especial care as such, but incident to the care of the mouth the tongue should be kept clean. It is so richly supplied with glands of excretion upon its dorsum that in any phase of abnormality affecting the nerves that ramify it, the dorsum retains, in the mucous surface depuratory substances. These are usually referred to as the coating of the tongue and the several different characters of appearance produced by these morbid exudations is considered by therapeutists to be of important diagnostic value.

Such accumulations should be removed from the tongue as far as possible, and for such purpose it is sometimes advisable to use a dull blade, an instrument that will not cut the tongue, but will remove the accumulation from it.

The *frenulum linguae* frequently extends too far toward the apex of the tongue, causing the condition called *tongue-tied*, in rare cases needing the attention of proper surgery.

Smell

The nose, like the tongue, is an organ constructed to perform several functions.

Its appendal or external part aids in giving character and perhaps beauty to the face and also serves as a thorough protection in the matter of respiration and smell.

One of the important functions of the nose is that of respiration. All inspiration should be performed through the nose. The nostrils are so constructed, as to shape the column of ingoing air, which is also warmed, while passing through the nose and naso-pharynx, so that it will strike within the

aperture of the larynx, in such way as not to strain that organ, or roughen the edges of the rima.

It must be admitted that the nose is too seldomly used in inspiration, but that fact does not remove the adverse effect of the error. An individual that does not inspire through the nose must pay the penalty, for not doing so, by abnormality of the larynx, trachea or bronchial tubes, or perhaps the whole of the air passages.

The nose is the organ of smell and the part of it devoted to that office, should be most carefully guarded and protected, and therefore should be used as little as possible, except for the specific purpose for which it is constructed. That is, the olfactory portion should, so far as possible, be protected from the current of air, incident to ordinary inspiration.

This protection may be accomplished by controlling the muscles of the nose so as to direct the column of air below the olfactory areas of the nasal fossae. By observing this rule, the olfactory portions of the fossae will be kept highly sensitive and keen; whereas, if respiration is generally performed through them, their powers will become dulled and weakened.

¶ The first essential, in the care of the nose is to keep it clean, and this should be accomplished by using its depuratory offices in a normal way, and not by mechanical interference and the projection of foreign substances into the nose ☙ The habit of many persons, of projecting the fingers and thumbs into the nose is very injurious and should not be followed ☙ ☙

Generally speaking, all forms of nasal douche, etc., are to be avoided, save only in the last emergency. It is a law, that all tubes of elimination that open to the surface are constructed to cleanse themselves without assistance, and are injured by being entered with any foreign substance for the purpose of assisting in elimination.

The nose has been a place, where commercial surgeons have fattened on an ignorant public. Except in cases of fracture, and possibly malignant fibrous tumors, there is never any occasion for surgery, in the normally formed nose.

It should be the object of each individual, to keep the nerves

ramifying the nose free from occlusion, in order that blood and lymph movement may be maintained freely.

This fact must be impressed upon those that wear glasses in this spectacle ridden age, for all kinds of glasses have the one serious defect, no matter what the form of their appliance, of occluding nerve stimulus to the nose and for this reason, and for general reasons as well, a thorough and deep massage of the appendal nose, on its whole exterior should be frequently performed.

CHAPTER NO. 40

Physiology—Seeing and Hearing

ANATOMIC SYNOPSIS

Seeing

THE eyes are the specific and immediate organs for the function of seeing.

There are two eyes, situated in the orbital cavities. The eye is divided for consideration into the *orbit*, the *eyeball*, the *refracting media*, and the *covering of the eyes*.

The orbit is a quasi-cavity, into which the optic nerve trunk of each side extends. It is lined and cushioned with a deposit of fatty substance, and also with a membrane called the *capsule of Tenon*, which after lining the cavities, is reflected to the eyeball, enclosing the perisclerotic lymph space in which the eyeball moves easily.

The eyeball is about an inch in the transverse diameter, and about nine-tenths of an inch, in the dorso-ventral diameter, being almost a sphere flattened slightly at the dorso-ventral poles.

The wall of the eyeball is composed, from without in, of the following coats, *sclerotic*, *choroid* and *retina*.

The retina is the inside coat and is the coat in which the *optic nerves* ramify.

The choroid is the middle brown coat, which shuts out all light, except in that part of it called the iris, through which there is an aperture called the pupil.

The sclerotic is the outside opaque coat and is tough, and invests the posterior five-sixths of the ball and is finished ventrally, by a transparent area, called the *cornea*.

The inside of the eyeball is separated into two chambers by

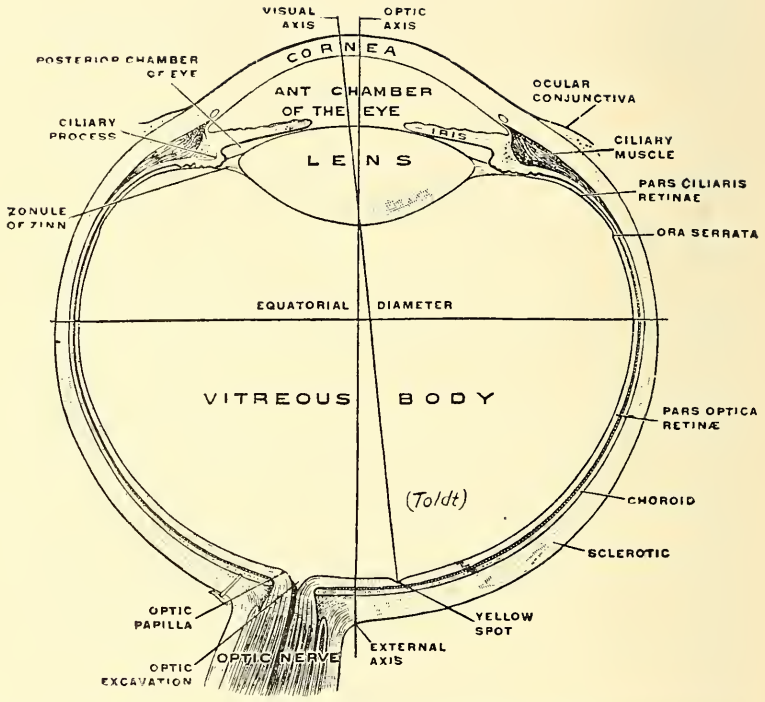


Fig. 38—Eyeball and Coats

The student will observe all of the parts are plainly named on this cut. He should also note the difference between the optic axis, which is the axis of the eyeball, in comparison with the visual axis which is several degrees removed from it. The cut represents the right eye.

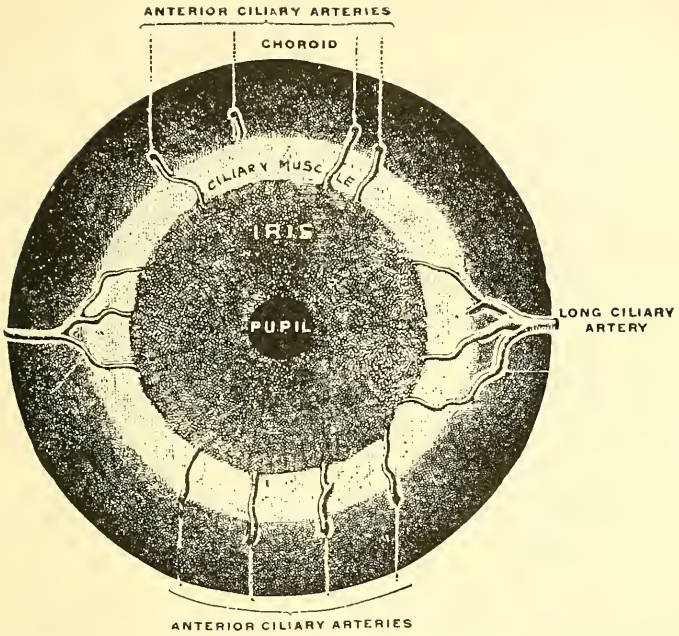


Fig. 39—Iris

This figure is intended to show the blood supply of the iris but when that subject is taken into consideration in connection with the lymph movement, the student will readily understand, how morbid accumulations mark the iris and how the death of cells in it, can be seen through the clear liquid.

the *crystalline lens* and its circular ligament. The ventral chamber is occupied by *aqueous humor;* the dorsal chamber by *vitreous humor.* These three constitute the refracting media. The ventral chamber is almost divided again by the *iris*, all refraction taking place through the pupil thereof.

The coverings of the eye are the headward and feetward eyelids, which are bordered with hairs, called lashes; and, lined with a refined skin, called *conjunctiva.* The area thus lined is called the *fornix.*

In the headward lateral aspect, each eye is supplied by the *lachrymal gland,* the excretion from which is called tears, and tend to cleanse the eyes.

Nerves—From the first, second and fifth cranial trunks, and from the fourth and twelfth thoracic trunks ramify the eyes.

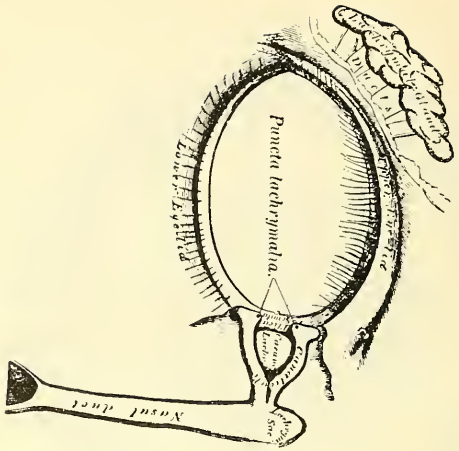


Fig. 40—Lachrymal Apparatus

The figure shows the apparatus of the right eye, the lachrymal gland lying head-lateral to the eyeball, its ducts discharging onto the headward part of the conjunctiva, the fluid finally reaching the mesial canthus, and being discharged into the nasal duct and then into the nose.

Hearing

The ear is said to be the organ of hearing, and is divided for consideration into the *external*, *middle*, and *internal ear*.

The external ear is composed of the *pinna* and *auditory meatus*. The pinna is the appendal part of the ear. The auditory meatus is partly cartilaginous and partly osseous, and extends to the middle ear, from which it is separated by the *tympanum*.

The middle ear is a prolongation, dorsalward from the Eustachian tube, through the petrous portion, into the mastoid portion of the temporal bone. The middle ear, composed of the mastoid cells and middle ear chamber, which opens laterally into the auditory meatus and mesially into the inner ear, both of which orifices are closed by diaphragms; the lateral one called the *tympanum;* the mesial one, the *fenestra ovalis*.

The two diaphragms of the middle ear are connected, by three bones, the *hammer*, *anvil* and *stirrup*, which carry vibrations of the tympanum, through to the inner ear.

The inner ear is called the *vestibule*, *cochlea* and *labyrinth*.

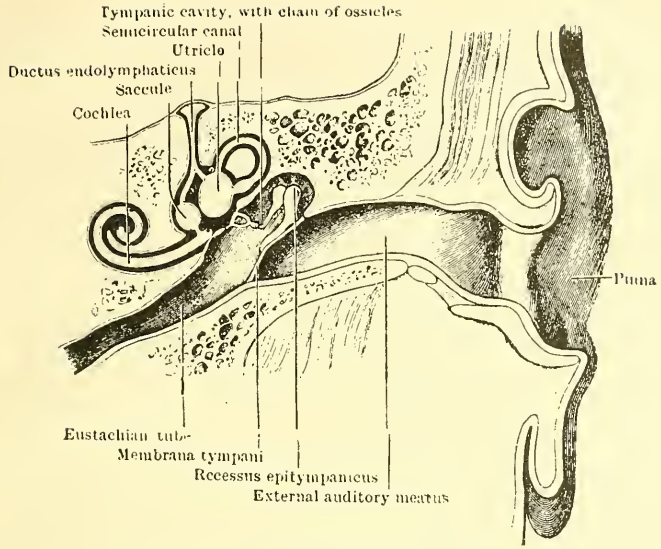


Fig. 41—The Ear

The schematic arrangement here shows the left ear, the headward part of the meatus, Eustachian tube, etc., is cut away, showing portion of the external ear, the whole middle ear and inner ear. The opening into the mastoid cells is not shown but it is in the head dorsal part of middle ear dorsal to articulation of the ossicles shown.

These are cavities in the petrous bone, and are occupied respectively by the *utricle* and *saccule;* the *cochlear tubes* and the tubes of the *semi-circular canals.* It is these structures that the auditory nerves ramify.

The osseous tube around these membranous tubes is full of lymph so that the tubes substantially float therein.

Nerves—The ears are ramified by nerves from three pairs of cranial trunks, and from the third thoracic and first and second pairs of cervical trunks.

PHYSIOLOGIC ANALYSIS

Seeing

The eye is the organ through which vision is accomplished. The value of this special sense needs no emphasis. It is perhaps the most valuable of any of the special senses.

The eye is a machine of very delicate construction and its

care should at all times receive the best attention of which the individual is capable. Without going into any considerable detail, so-called rays of light, falling into the eye, through the transparent cornea, aqueous humor, crystalline lens and viterous humor, are so refracted as to concentrate upon the retina of the eye, which contains the optic nerves, producing the vibration, translated into the sense of sight. ¶ In order that the amount of rays falling into the eye shall be controlled, the pupil must be contracted or dilated to meet the needs.

It is this muscular effort, when incorrectly or unadvisedly performed, that produces " eye strain," a form of irritation that affects, by motor reaction, brain cells and nerves, that in turn affect the stomach, upper small intestine, the liver, kidneys and heart; not always in the same degree but always to some extent and usually one of these organs gravely ☙ To the end that " eye strain " may be avoided the rays to the eye should be carefully regulated, and the habit of reading by uncertain light, such as twilight, or dim light should be avoided and also the habit of using the eyes in a certain manner for long periods without rest should be avoided ☙ The eyes should be kept clean, but in accomplishing this, foreign substances should not be put into them, excepting pure, and preferably soft water.

The best liquid with which to cleanse the eye, in its normal condition, is distilled water, of the temperature of spring water; drugs, especially antiseptics, should never be used in the eye, except as the very last resort, and the condition must indeed be grave before such need is reached.

The eyeballs should never be pressed heavily, nor rubbed and squeezed. The muscles of the eyeballs should be carefully exercised by rapid and frequent movements of the eyeball in every direction.

The tissues around the margins of the orbit, and in the immediate region, and over the temporal area and forehead, including the eyelids should be daily massaged, for the purpose of securing free radiation of stimulus and movement of liquids in these tissues.

The eye is not only an organ of vision; it is an organ of power, control and persuasion, to say nothing of beauty; but its most wonderful value is the fact that the *iris* faithfully presents functional conditions of all parts of the body. This is fully explained in "diagnosis from the eye," in Carver's Chiropractic Analysis.

Hearing

The ear is the machine through which vibrations are transmitted, that are translated into the sense of sound. Cleanliness and freedom of the parts are prime factors in the care of the ear. As to the inner ear, nothing can be done, by the individual, except to keep the nerves to it free from occlusion.
¶ The middle ear is a tube-like structure, beginning dorsally in the mastoid antrum, or spaces in the mastoid part of the temporal bone, and extending, generally ventral and mesial through the middle ear proper, and the Eustachian tubes into the naso-pharynx, all of which, is lined with mucous membrane, quite richly supplied with mucous glands.
It is of the greatest importance that the Eustachian tubes shall be kept free and open, in order that air may pass freely in and out of these cavities and therefore press equally on both sides of the tympanic membrane.
To secure this condition sometimes requires, removal of occlusion of stimulus to the nerves that ramify the dorsal walls of the naso-pharynx. Instrument interference with the Eustachian tubes, and the middle ear should be carefully avoided ☙ ☙
It is with the appendal ear and external auditory meatus, that the individual has most to do in the proper care of the ear ☙ ☙
The appendal portion, and the attached cartilaginous meatus, should at all times be kept thoroughly exercised, to the end that no solid residues of elimination shall deposit around them, making them inactive. A thorough ear massage is productive of removal of occlusion, from the nerves to the external ear and meatus and is valuable and essential ☙
Such massage also aids, in the elimination of accumulated

wax, from the deeper part of the external meatus. It is essential that the cerumen or wax, which is a mucoid exudation from the walls of the meatus, shall be freely eliminated, but where that function is not accomplished by the ear itself, under proper manipulation, the wax should be very gently removed ❧ ❧

If the *cerumen* is accumulated near the orifice of the meatus, it may be removed by some instrument well adapted to that purpose; but otherwise it should be gently washed from the meatus by a soft-nosed rubber syringe, the water should be projected, so as to never strike directly upon the tympanic membrane, but should be so directed as to reduce the force and current along the dorsal wall of the meatus, so that it will eddy across the membrane and thus return along the other wall ❧ ❧

Injection of water into the ear should very seldom be necessary, and where the need for such application occurs frequently, it is proof that the meatus is in very abnormal condition ❧ ❧

Generally speaking, the rule is that no foreign substance should ever be put into the ear for any purpose.

It seems hardly necessary to add that the ear should be protected as far as possible from violent shocks and so-called sounds ❧ ❧

CHAPTER NO. 41

Physiology—Male Procreation

ANATOMIC SYNOPSIS

THE male and female procreative organs, together constitute a complete system of procreation.

The external procreative organs of the male are the *penis*, *testes*, *scrotum* and parts of the *urethra*, *spermatic cord* and *vas deferens*. The internal organs are, parts of the *vas deferens* and *urethra*, and the *seminal vesicles*, *ejaculatory ducts*, *prostate gland*, and *sinus pocularis*.

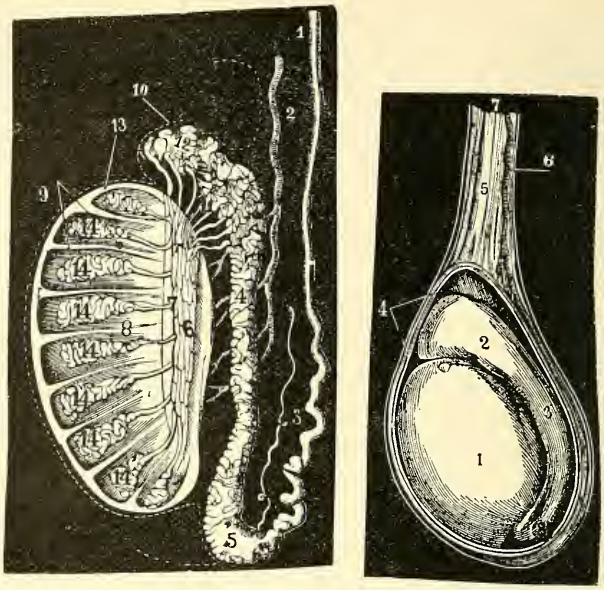
The testes are tubulated glands, that produce *spermatozoa*. They are suspended from the spermatic cords, which contain the nerves and arteries to the testes, and the veins and lymph vessels away from them.

The testes are two in number and are contained in the sac or dartos called the scrotum. The tubules of the testes have been variously estimated at three hundred, with a length of sixteen feet, to eight hundred with a length of two and one-fourth feet.

The tubules are estimated to be of a diameter of from one two-hundredths to one-fiftieth of an inch. This fact accounts for there being some doubt as to their length. The lobules of each testis have been estimated at from two hundred fifty to four hundred.

The testes, like all glands, have a cortex and medullary portion. At the base of the testis is the epididymis from which extends the vas deferens, about eighteen inches in length, through the spermatic cord, external abdominal ring, inguinal canal, ventral abdominal ring to the dorsal aspect of the pelvis, ending in the seminal vesicle.

The vas deferens convey the spermatozoa, produced in the



A B

FIG. 42—A—VERTICAL SECTION OF TESTIS. B—TESTIS AND COVERINGS.

A—1, Vas deferens; 2, Spermatic artery; 3, Vas aberrans; 4, Body of epididymis; 5, Globus minor; 6, Rete Testis; 7, Mediastinum; 8, Vasa recta; 10, Tunica vaginalis; 13, Tunica albuginea; 9, Its septa; 11, Vas efferentia; 12, Globus major; 14, 14, etc., lobuli.

B—1, Testis; 2, Head of epididymis; 3, Body of same; 4, Tunica vaginalis, parietal layer; 5, Cremaster; 6, Artery of spermatic cord; 7, Spermatic cord; 8, Tail of epididymis.

tubules of the testes, in their liquid, called *semen*, to the seminal vesicles.

The ejaculatory ducts, one from each side, extend through the prostate gland for a distance of three-fourths of an inch, discharging into the sinus pocularis, at about the middle portion of the dorsal wall of the prostatic urethra, by from twelve to twenty slit-like orifices.

The urethra extends from the bladder through the prostate gland, and membranous diaphragm of the pelvis, and thence throughout the entire length of the spongy body of the penis to the *glans*, ending in the *urinary meatus*.

The prostate gland is fitted, by its base, to the cervix of the bladder, while its apex extends almost directly feetward, and is supported by the triangular ligaments. The prostate structure, separates the bladder, seminal vesicles and rectum

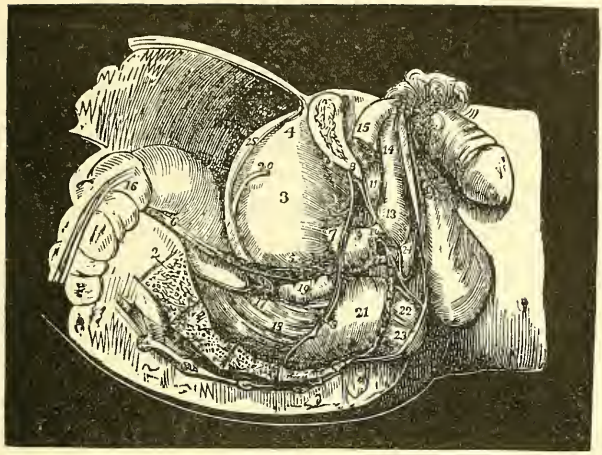


FIG. 43—RIGHT SIDE VIEW OF THE VISCERA OF THE MALE PELVIS

1, Divided surface of the os pubis; 2, Divided surface of the sacrum; 3, Body of the bladder; 4, Its fundus; from its apex is seen passing upward the urachus; 5, Base of the bladder; 6, Ureter; 7, Neck of the bladder; 8, 8, Pelvic fasciæ; 9, Prostate gland; 10, Membranous portion of the urethra; 11, Triangular ligament; 12, One of Cowper's glands lying beneath the membranous portion of the urethra; 13, Bulb of corpus spongiosum; 14, Body of corpus spongiosum; 15, Right crus penis; 16, Upper part of the first portion of the rectum; 17, Recto-vesical fold of peritoneum; 18, Second portion of the rectum; 19, Right vesicula seminalis; 20, Vas deferens; 21, The rectum covered by the descending layer of the pelvic fascia; 22, Part of the levator ani muscle investing the lower part of the rectum; 23, External sphincter ani; 24, Interval between the superficial perineal fascia and triangular ligament.

from each other, and is supported by the perineal body. The penis is a prismoid organ, from four to seven inches in length, placed about an inch below the symphysis pubis. It is composed of the *root*, *body* and *glans*.

The body of the penis is composed of the *corpora cavernosa*, which have origin from the rami of the pubes and extend ventral, side by side, ending by a blunt point, which is capped by the glans or terminal structure of the *corpus spongiosum*. ¶ The skin of the penis extends forward to the glans. That part of it covering the spongy body extending forward to the meatus, in a fold, is called the *frenum*. The remainder of the skin of the penis that extends to or over the glans is called, *the prepuce*.

The two bodies called the corpora cavernosa and the corpus spongiosum are so constructed as to contain vascular cavities, which, upon arousement of the procreative emotion, become

highly congested with blood, which results in what is called an *erection*. This process is aided by the erectile musculature that also applies itself to the penis.

Nerves—In the order of importance—second and first lumbars, and twelfth thoracic to the testes especially. The twelfth and eleventh thoracics to the urethra, seminal vesicles and the prostate gland, and the erectile tissue relative thereto; also to the spermatic cord and vas deferens. The second and fourth lumbars to the erectile tissues, spermatic cords, vas deferens and perineal body; and as to the perineal body, corpus spongiosum, scrotum and integument over the area described, the pudic nerves.

PHYSIOLOGIC ANALYSIS

The prime function of the male organs of procreation is to produce spermatozoa and semen and, under proper circumstances, deposit the same within the procreative apparatus of the female, in such manner that impregnation of ova may occur ❧ ❧

This function begins in the epithelial lining of the tubules of the testes by the production of a peculiar cell, that when matured is called a spermatozoon. These cells grow among the epithelial cells, from which they are characteristically different.

The remarkable thing about a spermatozoon is, that it has no independent power of reproduction until it has impregnated an ovum. At the same time these cells are produced, there is produced in the tubules a peculiar light colored liquid called semen, into which, when sufficiently matured, the spermatozoa drop and float until they have performed the office of impregnation; have been disintegrated, or have been discharged from the body.

Semen is a viscid, whitish liquid of characteristic odor. It is water with about eighteen per cent of solids, varying in formula, but containing fat, cholesterin, lectithin, proteids, nuclein, xanthin, chlorides, sulphates, phosphates of sodium and potassium. It will be observed that semen contains sufficient of the elements of the body to compose a substantial

nutriment for the spermatozoa for the period of their existence, as such.

The production of semen and spermatozoa, is a continuous process, in the human male. During the period of procreative ability many millions of these cells are produced. They are produced more rapidly under sexual excitation, and during periods of sexual activity.

The production of spermatozoa is greatly reduced during sexual abstinence, and the absence of sexual excitation. This function of the testes has been known to be wholly lost, by non-use, and to be wholly lost, by excessive use.

The law, with respect to these organs, as with others, is that normal and correct use is essential to health, and virility, and that any other phase, or degree of use is injurious and debilitating ❧ ❧

The impulse to procreate is practically continuous with the normal male during the entire period of sexual ability. This emotion, like others, should be carefully safeguarded and kept under the control of mind, which should be stored with the essential facts pertaining to the use, health and resistance of these organs.

It will be seen, that the essential organs of male procreation are the testes. These are suspended from the body, below the pubis, by the spermatic cords, which contain arteries, veins, lymph vessels, nerves and the seminal ducts, all bound together and supported by a musculo-membranous substance.

¶ The spermatic cords have great contractility, as do the scrotal tissues. In order that these tissues shall retain their power they should be thoroughly protected, and yet in their protection they should not be debilitated. Appliances should never be used, to suspend the carrying function of the cord, except under great debility, and then as an emergency measure to be dispensed with upon returning virility.

The scrotum should be exposed to the free passage of air as much as is possible in civilized dress. Care should be taken that the clothing shall not be tight about this part of the body, and the scrotum should never be wrapped in the clothing. This is especially true in warm climates.

It will not be necessary, to more than refer to the fact, which is fully suggested by their protected position on the body, that the testes should never be subjected to blows, violent shocks, or unusual pressure.

The penis next to the testes, is essential to procreation, and is, generally speaking, the best cared for by the least attention to it, provided always that it is normally constructed. It must however be remembered that this organ especially the glans, must be kept in sanitary condition. The glans of the organ become a subject of constant care, where the prepuce is sufficiently long to cover it.

There is a rich exudation of mucoid, and sebaceous substances, from the inner surface of the prepuce, around the neck of the glans, which is of a chemical character, liable under heat and close confinement, to quickly become rancid, and in this state the substance is an active irritant, producing much excitation and widespread motor reaction ☙

The long prepuce quite frequently occurs. In children, it requires the most scrupulous attention, on the part of the mother or nurse, since the irritation described, not only operates to seriously affect the health of the child, but is a fruitful source of *infantile masturbation*, with all its dread consequences, not infrequently resulting in *insanity* and very frequently in *perversion and mental degeneracy*.

If the prepuce is unusually long and especially if tight, or banded so as to squeeze the glans, or the neck of the penis dorsal to the glans, circumcision by an expert operator is indicated, as early as possible, the earlier the better.

No attention on the part of the individual can be directly given to the internal organs, farther than has already been suggested in this chapter, but an understanding of them will aid the individual materially in their protection.

The seminal duct or vas deferens, as has already been stated, conveys the semen, carrying within itself, spermatozoa up the spermatic cord through the external abdominal ring, the inguinal canal, through the visceral abdominal ring and down along the walls of the pelvis to the seminal vesicles.

Much of this distance is against gravity and it will be

observed, that this fluid is moved by the direct force of nerve stimulus, *a phenomenon not before pointed out in physiology.* It is mentioned here to direct the student's mind to the value of keeping the nerves, that control this function, free from occlusion ☙ ☙

The seminal vesicles are dorso-headward to the prostate glands, between the rectum and bladder. It will be seen that the prostate gland, supports these vessels, and also the urinary bladder, protects the prostatic urethra, and aids in keeping in proper relation the sphincters of the bladder and the erectile tissue of the *sinus pocularis.*

It is frequently overlooked, that the *sinus pocularis* is the analogue of the uterus, and its normal shape and freedom is essential to the undisturbed ejaculation of semen into the urethra, on its way to the point of function, in the act of procreation ☙ ☙

No operation can be performed on the prostate gland, urethral orifice of the bladder or relative tissue, without in part, destroying this function.

Generally speaking the function of *ejaculation*, and the *erectility* of the tissues, will be interfered with in ratio with the *number of nerves cut, destroyed or rendered inoperative by any instrumental interference.*

It is hardly necessary to add, that the transmission of semen from the sinus pocularis to the meatus of the glans, could not be accomplished, without the co-operation of the erectile tissues along the entire tract, and since the function of these tissues is always lost in ratio with occlusion of stimulus in the nerves to them, the student will grasp the importance of situ of the sacro-iliac and lumbar articulations.

All that has been said as to the urethral tract and bladder, applies as fully to the urinary function as to that of procreation, except that in the transmission of urine from the bladder to the meatus the accelerator and compressor muscles are involved instead of the erectile tissues.

Too much emphasis can not be placed upon, the value of the support of the prostate to the seminal vesicles and bladder. It will be recalled that the prostate is headward from the

perineal body, which rests upon the dorsal aspect of the triangular ligaments headward from the transverse perineal muscle, and in this position, so long as these tissues maintain their size, and occupy their proper relation, proper function is assured.

This fact explains the agonizing conditions, and the frequent loss of function, incident to the weakening of the transverse perineal muscles and the triangular ligaments, and the debility or atrophy of the perineal body.

These conditions are frequent in old men; and as a result of the frequency of venereal disease are often present in the young.

In such conditions, a prostatic support, pending recovery of virility is always indicated. Such a support would avoid much agony in old age, and would frequently avoid suppression of urine and failure of function in other respects. The glandular structure of the prostate and Cowper's glands exude rich lubricants into the urethra which prevent the semen and spermatozoa from adhering to the walls or in any manner being checked in passage.

CHAPTER NO. 42

Physiology—Female Procreation

ANATOMIC SYNOPSIS

THE female organs of procreation are partly external and partly internal.

The external organs are the *mons veneris*, *labia majora*, *labia minora*, *urethra*, *vaginal orifice*, *vestibule* and *clitoris* ☙ The internal organs are the *ovaries*, *Fallopian tubes*, *uterus* and *vagina*.

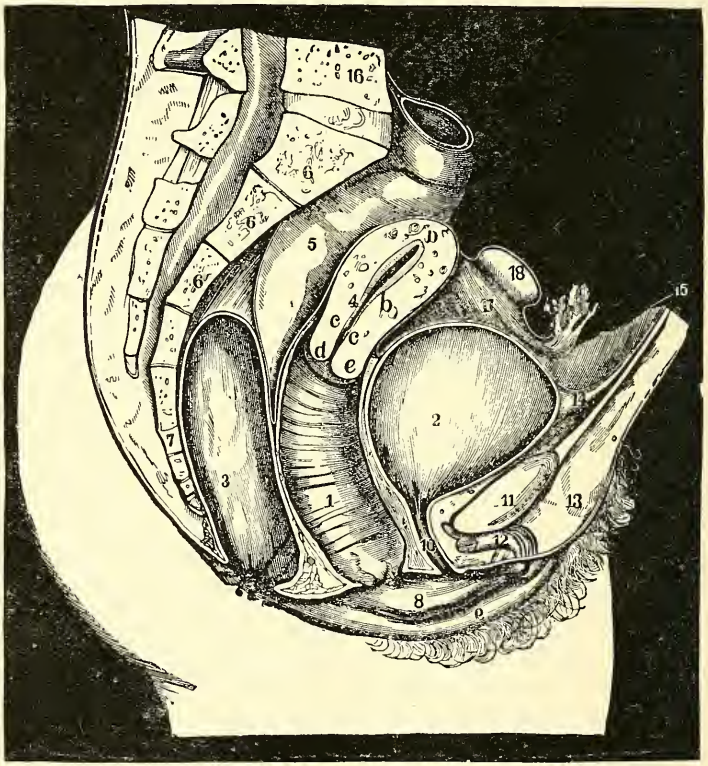
The ovaries are, in every sense analogous, to the testes. They are oval, elongated bodies, situated on each side of the uterus, against the dorso-lateral wall of the pelvis, between the layers of the *broad ligament*. They are attached to the uterus by the *ovarian ligaments*. These glands occupy the recess in the soft tissue of the sciatic notch, and are overhung ventrally, by the psoas muscles.

The normal axis of the ovary is almost head-feetward, the tubular end headward, while the polar or fimbriated end is feetward, the fimbriated end being attached to the *fimbria* of the Fallopian tubes, which are the *oviducts*, and carry *follicular liquid* and *ova*, from the surface of the ovary, into the uterus and vaginal tract.

The ovaries contain many small vessels, called *Graafian follicles*, which are about one one-hundredth of an inch in diameter. At puberty these follicles begin development, and continue to develop and discharge ripened ova throughout the fruitful period of the woman.

Generally there is but one ovum ripens at the same time, but several may be discharged within a very short period ☙ The epithelial cells, of the Graafian follicles become nests in which ova develop; one primordial ovum developing in each

nest. As the ovum grows, the sac deepens into the substance of the ovary and approaches the surface also. At maturity of the ovum, the vessel ruptures and the ripened ovum with its follicular fluid, which is analogously the same as semen, comes out upon the surface of the ovary and from thence by nerve stimulus, is impelled into the fimbriated extremity of the Fallopian tube, and into its ampulla, from which it is used in copulation ☙ ☙



VISCERA OF FEMALE PELVIS.

FIG. 44—VISCERA OF FEMALE PELVIS

1, Vagina; 2, Bladder; 3, Interior of rectum; 4, The Uterus: a, fundus; b, cervix; c, c, os uteri; d, dorsal portion; e, ventral portion; 5, Rectum, here covered by peritoneum; 6, 6, 6, Sacrum; 7, Coccyx; 8, Labia minora; 9, Labia majora; 10, Urethra; 11, Symphysis pubis; 12, Clitoris; 13, Mons Veneris; 14, Urachus; 15, Section of peritoneum; 16, Last lumbar vertebra; 17, Broad ligament; 18, Ovary.

The uterus is a hollow, muscular organ in which gestation takes place. It occupies a position between the bladder and rectum. The uterus is very thick walled and generally is a very mobile organ within certain, fixed limits. It is classified as being composed of a *fundus*, *body* and *neck*. The neck is called the *cervix;* the entrance from the neck into the body is called the *internal os*, while the end of the tube in the vagina is called the *external os*.

The virgin uterus is a pear shaped, flattened organ, with its fundus directed head-ventral, while its cervix looks feet-dorsal, standing upon a slant of about forty-five degrees. The adult uterus measures about three inches in length, two inches in breadth, one inch in thickness.

The uterus extends into the vagina, which is attached around its cervix. The vaginal fold around the attachment is called the fornix. It is considered therefore as the headward fornix and feetward fornix.

The uterus is retained relatively near its position by its ventral and dorsal ligaments; its right and left broad ligaments; its sacro-uterine ligaments, and the two round ligaments. Anatomically, the uterus is not suspended in any manner, but in its position, is a buoyant organ.

The vagina is a musculo-membranous tube, extending from the cervix of the uterus to the vaginal orifice, at the pudendum. It is very richly supplied with erectile tissue. It is about two and a half inches long on its headward surface and three and a half inches long on its feetward surface. It is very elastic, and is capable of great elongation and great distension. In this connection it must be remembered, that it is through this tube, that the fetus is projected at delivery ☙ Dorso-feetward to the vagina, and feetward to the cervix of the uterus is the perineal body, which furnishes much support to the buoyancy of these organs.

The clitoris is an erectile structure and is in every sense, analogous to the penis, except that it is not traversed by the spongy body and urethra. It is composed of the *corpora cavernosa*, which end bluntly, and are capped by the *glans clitoris*, a small substance very richly supplied with *sensory nerves* ☙

The clitoris is about one and a fourth inches in length. It is enfolded by the labia minora, which from the lateral folds form its *prepuce*. That extending on the feetward aspect of the clitoris forms the *frenum clitoris*.

The urethra extends from the bladder in the headward wall

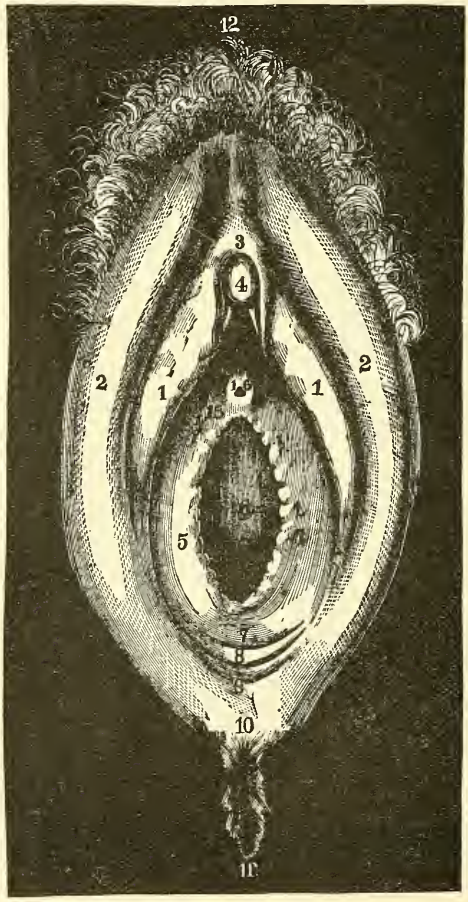


Fig. No. 45. The Vulva.

1, 1, Labia minora, or Nymphæ; 2, 2, Labia majora; 3, Clitoris prepuce; 4, Glans clitoris; 5, 5, Caruncula myrtiformes; 6, Orifice of vagina; 7, Fourchette; 8, Fosas navicularis; 9, Posterior commissure; 10, Perineum; 11, Anus, 12 Mons veneris; 15, The vestibule; 16, Meatus urinarius.

of the vagina, and opens just headward to the vaginal orifice. The labia minora furnish a soft, moist protection, to the vaginal and urethral orifices, and should be covered by the labia majora.

The labia majora are two prominent folds of skin, underlaid by a considerable fatty tissue that extends over the pubes, constructing the *mons veneris*, dying away to practically level structures at the dorsal aspect of the vaginal orifice. These labia are thickly covered with strong, crisp hairs, and are for the protection of the pudendal slit, and its sensitive structures. ¶ The external organs of the female, considered as a whole, are called the *vulva*.

In addition to these, as accessory, there are the mammaries, composed of two aggregations of glands, one at each side of the thorax, extending longitudinally from the third to the seventh ribs, and laterally from the sternum to the axillae. ¶ Nerves—In order of their importance; first and second lumbars to the vagina and labia; the second and first lumbars and twelfth thoracic to the ovaries, Fallopian tubes and uterus; the fourth and fifth lumbars and first and second sacral to the erectile tissues of the vagina and vaginal orifice, and to the crura of the clitoris, the pudic nerve trunks to the perineal body, integument of the vulva, prepuce, glans clitoris and the immediate skin in this area.

The mammary glands are ramified by nerves from the second to the sixth thoracic trunks inclusive, but principally from the second, third and fourth thoracic trunks.

PHYSIOLOGIC ANALYSIS

The function of female procreation, begins with the production of ova, in the Graafian follicles of the ovaries. Here an ovum is produced by a process of budding among the epithelial cells, lining the Graafian follicles.

The remarkable thing, in connection with this process is, that the ovum, is not characteristically like the cells among which it grows, but in itself, has no power of reproduction and only exhibits this power when its *oolemma* or outside

covering is pierced by a *spermatozoon* in the process of *impregnation*.

When an ovum is matured, the follicle ruptures and the follicular liquid, which is of the same consistence as semen, escapes to the abdominal surface of the ovary, bearing the ovum with it; from which place it is propelled by nerve stimulus, usually against gravity, into the fimbriated extremity of the Fallopian tube, and thence into the ampulla of the tubes, which are analogous to the seminal vesicles, and act as reservoirs of emergency, to the function of procreation. From the ampulla, ova in follicular liquid, are projected into the cavity of the uterus, and thence through the cervix into the vagina.

Some discussion is still indulged as to where impregnation takes place; some authors suggest the Fallopian tubes. It seems, however, perfectly clear that impregnation may take place, at any point from just within the vaginal orifice to the ovarian surface.

The entire experience of the human family, however, tends to prove that, impregnation generally takes place at or near the external os of the uterus. Nothing further will be cited to sustain this position than the relationship of the meatus of the glans, to the os in the act of copulation.

The production of ova, in the ovaries of the female, generally speaking, is continuous throughout the fruitful period of the woman, that is from *puberty* to the *menopause*.

The number of ova produced by different females differ greatly, depending upon hereditary tendency, normality of construction, health and sexual activity or sex excitement ❧ The number of ova produced, however, are very few in comparison with the number of spermatozoa produced by the male ❧ ❧

A normal woman is not constantly the subject of the procreative impulse. Given normal construction of the parts, and removed from adverse hereditary, mental tendency, a woman should be the subject of the procreative impulse, but for a short time, from a few hours to a day or two, once each twenty-eight days.

It is with profound regret, however, that it must be admitted, that under the abuses, that men have inflicted upon women for perhaps thousands of generations, women have become sufficiently abnormal, mentally and physically, to generally entertain much the same attitude to the procreative act, as that of men.

However, before the human family can evolve to the physical splendor to which it is entitled, all this must be changed and women must come to know, that in order to be proper mothers of the race they must, during the fruitful period of their lives, live undisturbed, according to the animalistic laws of procreation. I do not seek to explain how this will be brought about, but only state the scientific fact, and leave the social problem to others.

At the end of the fruitful period, the ovaries cease to produce ova and shrink somewhat in size. However, the Fallopian tubes, always remain as depuratory channels, discharging into the uterus.

The uterus is an organ of dual function. During the fruitful period, it is a sort of reservoir of follicular liquid bearing ova, which fact, converts it into a depuratory receptacle, which depuratory substance, should normally be eliminated each twenty-eight days.

It is because of this fact, as well as others directly incident thereto, that suppression of the *menses* is so deleterious, and results in such profound irritation, producing so much motor reaction and wide spread occlusion to different parts of the body ❧ ❧

Too much emphasis can not be placed upon the necessity for *regular menstruation*, during the fruitful period, and free drainage from the uterus subsequently, during life.

The uterus, as has already been stated, in the chapter on embryology, is the receptacle, in the wall of which, the impregnated ovum develops, until its expansion occupies the uterine cavity, and until the embryo has passed through the stages of development to a fetus, which is called *full term* or until expulsion from the uterus.

It needs only to be observed in passing that the uterus is a

very mobile organ, and that its freedom of movement within the scope of its normal area should be maintained at whatever cost.

Teaching upon this subject, has led to the assumption that the uterus is a fixed organ, and commercial surgery has acquired much advantage as a result thereof. There has been much exploitation of the proposition of uterine displacement. In the abstract, this is all wrong and has had a very injurious effect upon the human family.

An *abnormal uterus is sometimes displaced*, but when it is, it is so because of displacement of relative tissue; generally the result of occlusion of nerves, primarily produced, by displacement of the bones composing the dorsal pelvic wall, as well as the changes in the position of those bones, forcing a change in the position of the pelvic viscera.

A normal uterus is never displaced, and a normal uterus always moves readily in any direction, by the application of gentle force. Because of this fact, the dress of females, has gravely influenced the position of the uterus.

In some way which it is not necessary to discuss, civilized human beings, generally, got the concept, that the waist of a woman should be small and for thousands of generations, have sought to mould her to that form, when she should be relatively broader through the back, at the waist than the man, in proportion to her height.

The dress, incident to the abnormal concept of woman's form, *has resulted in the compression of the abdominal viscera into the pelvis*, forcing the uterus to occupy a deeper position in the pelvis, and nearer the pubis than normal; thus rendering the organ less mobile than it should be, making it a center of irritation, with constant traction on nerves, producing occlusion, which in turn causes all forms of tissue debility, in the uterus itself, and relative erectile tissues, as well as catarrh, cysts, tumors, etc.

The vagina, as has been stated in the anatomic synopsis is a musculo-membranous tube, extending from the cervix of the uterus to its orifice at the vulva.

Aside from its function of carrying depuratory substances,

from the Fallopian tubes and uterus to the surface of the body, and delivery of the fetus, it is constructed solely, for the projection of the penis of the male into it, in the act of copulation, and is so fashioned, that, under reasonably normal conditions, its application to that organ is sufficiently intimate to assure the delivery of semen and spermatozoa at the orifice of the uterus.

Comparatively speaking, the mucous lining of the vagina is a very extensive surface, when considered from the richness of its nerve supply. Its function is a delicate one, and it is a delicately constructed organ, not from the standpoint of its strength or resistance, but from the standpoint of its great sensitiveness.

Aside from its function in copulation, it is the passage through which at term, the delivery of the fetus is accomplished, and in the accomplishment of that function, by traction the nerves are occluded sufficiently to render it practically non-sensitive, for that time.

The vagina is not constructed for entrance into it, of other foreign substance, than that necessary to procreation, and generally speaking the pernicious habit of douches, and the application of any substances in it, are injurious to it—not only to it, but because of its richness of nerve supply by motor reaction, to many vital centers of the body.

There is no one adverse habit, that will more generally and subtly injure the health of a woman, than regularity of the *vaginal douche*. In anything like health, this tube will perfectly cleanse itself. When it does not do so the individual may know that she is far from well.

The clitoris performs much the same function in the procreative relation as the glans of the male. Nothing further need be said of it except to say that its glans is remarkably sensitive. The same precautions with regard to it should be observed as those suggested as to the glans penis.

The prepuce, composed of the folds of the labia minora, should at all times be kept in a sanitary condition, and if found to be constricted or sufficiently abnormal to press upon or irritate the glans, or to prevent free depuration from about

them, then such surgical assistance as will accomplish that result, is indicated, but surgical interference is a last resort in emergency, and should not be resorted to freely; and in any event not until all other, proper means, have been tried. ¶ As to the tissues of the vulva, all that need be said, is that they should be kept clean and free from all forms of irritation; submitted as much as possible to the influence of the air, and not enfolded, in the clothing, in such manner as to debilitate or irritate them.

Clothing that draws through, or into the pudendal slit should be especially avoided, because of their general irritating tendency, and in children and young girls, because they often induce the habit of *masturbation*.

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